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UNITED STATES NAVAL AVIATION 1910–60

Prepared at the direction of the
DEPUTY CHIEF OF NAVAL OPERATIONS (AIR)
and the
CHIEF OF THE BUREAU OF NAVAL WEAPONS

1960

FOREWORD

The year 1961 marks the golden anniversary of naval aviation. From an idea held by a few men of prophetic vision and grim determination, and tangibly portrayed by three bamboo, spruce, wire and fabric aeroplanes assigned to an aviation camp of dubious utility, naval aviation has grown, in the span of a half century, to be the heart of modern sea power.

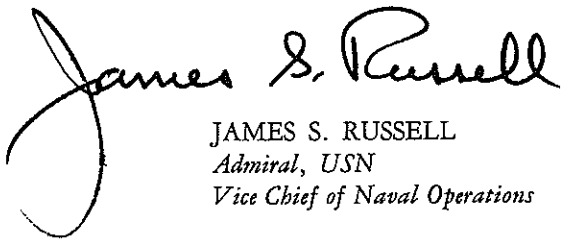
In retrospect, this growth appears to have been a logical outcome of advancing technology which was bringing the nations of the world into ever closer contact at a time when in the face of international unrest the United States was assuming an ever-more prominent position of world leadership. Aircraft have developed into complex instruments calling upon the finest in engineering and scientific training and experience. Despite, or perhaps because of its dependence upon a multitude of scientific disciplines, naval aviation remains an art, and one which is respected, desired and essential.

The acceptance of aviation by the Navy and the growth of a powerful naval air arm has stemmed from the basic fact that aviation has provided the Navy with services essential for control of the sea in an ever-changing age. Partly because of its usefulness and partly because of its demand for an ever-higher level of support it has transformed the entire Navy. The forces afloat and the industrial and training facilities ashore, as well as the command and administrative structure whereby these diverse activities are made integral parts of the Navy, have been reshaped and revitalized.

Each step in naval aviation's growth posed problems which, to those who faced them, were as serious as the problems of today are to us. Difficult choices had to be made and even now it is impossible to say whether certain areas of endeavor suffered from too little or too much attention. As decisions were made, they cut across the fabric of aviation and the Navy, exerting influence throughout the Nation and the entire world.

In this anniversary year, naval aviation is being enriched by another small group of men with prophetic vision and grim determination. Like the pioneers of half a century ago, this avant-garde of the space age stands on the threshold of a new era ready to volunteer exploration of strange and distant worlds.

This chronology of naval aviation has been prepared to show significant events in its growth and development in the belief that the understanding of the past which it engenders will be of assistance in solving the problems of today and an inspiration in the world of tomorrow.



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INTRODUCTION AND ACKNOWLEDGMENTS

Preparation of this chronology was initiated in 1956 at the direction of Vice Admiral Thomas S. Combs, Deputy Chief of Naval Operations (Air) and Rear Admiral (now Admiral) James S. Russell, Chief, Bureau of Aeronautics. Their basic instruction was to prepare a record of events of special interest and lasting significance pertaining to the growth of United States naval air as an element of sea power, its employment and accomplishments in war and peace, and the development of its tactics, weapons, and material. The scope of the subject was defined as including the air elements of the Navy, the Marine Corps, the Coast Guard in time of war, and the relatively new area of guided missiles. Coverage was to be comprehensive without sacrificing quality.

As interpreted by the authors the directive permitted considerable freedom yet at the same time imposed rigid standards requiring the careful scrutiny and testing of all available data to determine both the accuracy and the relevancy of whatever was selected. Adherence to these standards, while necessary to distinguish between the fact and the legend of which naval aviation appears to have more than its share, posed a research task of surprising magnitude.

One of the drawbacks of chronologies as a form of exposition stems from the fact that they record, or chronicle, events with no attempt at explanation. This chronology departs from that form, particularly for periods of extended endeavor such as the war campaigns and for developments in various technical areas. Some types of information, important to the history of naval aviation and properly a part of its record, become monotonous repetition when included in a chronology. Where such information was amenable to statistical or tabular treatment it was incorporated in appendixes. For reference purposes two special indexes were used, one an index by days, the other an index by subject grouping. Looseleaf format was selected to permit the periodic addition of supplementary material.

Within the basic framework of their directive, the authors were given a free hand. Determination of what events were significant and should be included as well as the more professional question of how to portray and interpret each were resolved by the authors. The style and character of the work together with any opinions expressed or conclusions reached are theirs and theirs alone.

The authors wish to acknowledge the wholehearted support of Admiral Combs and Admiral Russell and their successors as Deputy Chief of Naval Operations (Air) and as Chief of the Bureau of Aeronautics and later the Bureau of Naval Weapons. They are particularly grateful for the support of their immediate superiors successively CDR Bart J. Slattery, CAPT E. G. Colgan, and CDR George F. Rodgers in DCNO (Air); CAPT J. K. Leydon, CAPT Barton E. Day and Mr. Charles M. Merriman in the Bureau of Aeronautics; and Mr. Eric Collins in the Bureau of Naval Weapons.

The authors appreciate the generous services of those in charge of records in the various Navy Department mail and file rooms, in the National Archives, the Federal Records Center, Alexandria, the Division of Naval History, the Marine Corps Historical Branch and of the personal papers in the collection of the Naval Historical Foundation. Naval officers on both active and retired lists and civilian employees of the Navy Department gladly opened both their files and their memories. Among them, the interest and encouragement of Alfred V. Verville, that Elder Statesman of Aviation, was particularly appreciated. Heartfelt thanks go to all who thus contributed.

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Illustrations—which appear at the end of each part are official U.S. Navy photographs except as follows:

Naval Historical Foundation p. 17 top right and p. 20 bottom; National Archives p. 17 bottom, p. 20 top left, p. 38 top, p. 35 top right and bottom, p. 59 top and bottom; Mrs. G. D. Murray p. 18 top center, Mrs. T. A. Nisewaner p. 18 top right, C. G. Bartlett p. 33 top and p. 36 bottom. U.S. Marine Corps p. 64 top right, p. 126 2d row left, p. 127 bottom, p. 144 top right, p. 159 top left and bottom left, p. 163 2d row center and p. 188 2d row right; U.S. Coast Guard p. 125 2d row; International News Service p. 19 bottom right. Bell p. 188 top left, Chance Vought p. 161 2d row left, p. 162 top and p. 189 bottom; Convair p. 184 2nd row left, Douglas p. 186 bottom left, Grumman p. 186 top right, Martin Co. p. 139 bottom left and p. 184 3d row left; North American p. 139 bottom right, and p. 186 bottom right; Sikorsky p. 188 2d row left.

PART I
THE BEGINNING
1910–16

Naval Aviation began in 1911. Actually interest in airplanes as naval weapons was shown as early as 1898 when naval officers were appointed as members of an inter-service board to investigate the military possibilities of Samuel P. Langley's flying machine. In subsequent years there were naval observers at air meets here and abroad and at the public demonstrations staged by the Wright Brothers in 1908 and 1909. All were enthusiastic about the potential of the airplane as a fleet scout. By 1909, naval officers, including a Bureau Chief, were urging the purchase of aircraft for naval purposes.

It was in 1910 that a place was made for aviation in the organizational structure of the Navy. That was the year CAPT. Washington Irving Chambers was designated as the officer to whom all aviation matters were to be referred. Although holding no special title, he pulled together existing threads of aviation interest within the Navy and gave official recognition to the proposals of inventors and builders. Before the Navy had either planes or pilots he arranged a series of tests in which Glenn Curtiss and Eugene Ely dramatized the airplane's capability for shipboard operations. The subsequent landing and takeoffs from combatant ships in Hampton Roads and San Francisco Bay and the hoisting aboard of the first seaplane in San Diego Bay, showed the world and a skeptical Navy that aviation could go to sea.

Early in 1911 the first naval officer reported for flight training. By mid-year, the first money had been appropriated, the first aircraft had been purchased, the first pilot had qualified, and the site of the first aviation camp had been selected. The idea of a seagoing aviation force was beginning to take form as plans and enthusiasms were transformed into realities. By the end of the year a humble beginning had been made.

The need for more science and less rule of thumb was apparent to CAPT. Chambers. He collected the writings and scientific papers of leaders in the new field, pushed for a national aerodynamics laboratory, and put naval constructors to work on aerodynamic and hydrodynamic problems. A wind tunnel was built by the Navy, and the National Advisory Committee for Aeronautics was established. The first real study of what was needed in aviation was conducted by a board under Chambers' leadership and included in its recommendations the establishment of a ground and flight training center at Pensacola, the expansion of research, and the assignment of an airplane to every major combatant ship of the Navy.

Progress in these early years was marked by an endurance record of 6 hours in the air, the first successful catapult launch of an airplane from a ship, exercises with the Fleet during winter maneuvers at Guantanamo, and combat sorties at Veracruz. These were but some of the accomplishments by pioneer pilots. Their activity furthered the importance of aviation in the Navy and the title of Director of Naval Aviation was bestowed on Chambers' successor, CAPT. Mark L. Bristol. By 1914, Secretary of the Navy Josephus Daniels announced that the point had been reached "where aircraft must form a large part of our naval forces for offensive and defensive operations."

...y of the Navy approved the recom-
...f the Chief Constructor that an officer
om ...Bureau of Construction and Repair and
...ort ...rom the Bureau of Steam Engineering be
...ed to investigate the subject of aviation and
...echnical knowledge of airplanes, and directed
...t these officers keep CAPT. W. I. Chambers,
...eviously designated to serve in a similar capacity
in the Secretary's office, fully informed of work contemplated and the results of all experiments.

22—The International Aviation Tournament opened at Belmont Park, N.Y. Attending in an official capacity as Navy observers were the three officers recently named to investigate aviation: CAPT. W. I. Chambers, Naval Constructor W. McEntee, and LT. N. H. Wright.

31—The Chief of the Bureau of Construction and Repair suggested to the Secretary of the Navy that steps be taken to obtain one or more aeroplanes to develop their use for naval purposes and recommended that in the absence of specific funds for their purchase, specifications for the battleship *Texas* be modified so as to require its contractors to supply one or more aircraft as a part of their obligation.

NOVEMBER

14—FIRST TAKE-OFF FROM A SHIP—Eugene Ely, a civilian pilot, took off in a 50-hp. Curtiss plane from a wooden platform built on the bow of the USS *Birmingham*. The ship was at anchor in Hampton Roads, and Ely landed safely on Willoughby Spit.

29—Glenn H. Curtiss wrote to the Secretary of the Navy offering flight instruction without charge for one naval officer as one means of assisting "in developing the adaptability of the aeroplane to military purposes."

DECEMBER

23—The first naval officer to undergo flight training, LT. T. G. Ellyson, was ordered to report to the Glenn Curtiss Aviation Camp at North Island, San Diego.

1911

JANUARY

18—At 11:01 a.m., Eugene Ely, flying a Curtiss pusher, landed on a specially built platform aboard the armored cruiser USS *Pennsylvania* at anchor in San Francisco Bay. At 11:58 he took off and returned to Selfridge Field, San Francisco, completing the earliest demonstration of the adaptability of aircraft to shipboard operations.

26—The first successful hydroaeroplane flight was made by Glenn Curtiss at North Island, San Diego. This important step in adapting aircraft to naval needs was witnessed by LT. T. G. Ellyson, who assisted in preparing the plane for the test. Five days later a single float was successfully tested in lieu of the tandem arrangement originally used, thereby establishing a basic aircraft float configuration.

FEBRUARY

10—Acting Secretary of the Navy Beekman Winthrop directed the Point Loma, Calif., Wireless Station to cooperate with CAPT. Harry S. Harkness, U.S. Aeronautical Reserve, in experiments in connection with use of wireless from aeroplanes.

17—In another of the early demonstrations of the adaptability of aircraft to naval uses, Glenn H. Curtiss taxied his hydroaeroplane alongside the USS *Pennsylvania* at anchor in San Diego Harbor, was hoisted aboard and off again by ship's crane and then returned to base.

MARCH

4—The first funds for naval aviation were appropriated, providing $25,000 to the Bureau of Navigation for "experimental work in the development of aviation for naval purposes."

9—The Wright Company made a formal offer to train one pilot for the Navy contingent upon the purchase of one airplane for the sum of $5,000. This offer was later made unconditional, and LT. John Rodgers was ordered to Dayton for flight training.

17—LT. John Rodgers, destined to become Naval Aviator No. 2, reported to the Wright Company at Dayton, Ohio, for instruction in flying.

APRIL

1—CAPT. W. I. Chambers, the officer in charge of aviation, reported for duty with the General Board, a move suggested by ADM. George Dewey, when space for aviation was not available in the office of Aid for Operations.

14—The embryo office of naval aviation was transferred from the General Board and established in the Bureau of Navigation.

MAY

8—CAPT. W. I. Chambers prepared requisitions for two Curtiss biplanes. One, the *Triad*, was to be equipped for arising from or alighting on land or water; with a metal tipped propeller designed for a speed of at least 45 miles per hour; with provisions

in principle to those that, some 30 years later, would make jet propulsion practical. Chambers wrote, "In my opinion, this turbine is the surest step of all, and the aeroplane manufacturer who gets in with it first is going to do wonders."

25—LTs. T. G. Ellyson and J. H. Towers, on a flight in the A-1 from Annapolis to Fort Monroe, Va., to test the durability of the aircraft on cross-country flight, were forced down by a leaking radiator near Milford Haven, Va., having covered 112 miles in 122 minutes.

NOVEMBER

8—ENS. V. D. Herbster, later designated Naval Aviator No. 4, reported for flight instruction at the Aviation Camp at Annapolis.

14—The Navy's first major aircraft modification, conversion of the Wright B-1 landplane into a hydroaeroplane, was initiated with a telegraphic order to the Burgess Company and Curtis, Marblehead, Mass., for a suitable float.

DECEMBER

20—Experiments with airborne wireless transmission were conducted at Annapolis by ENS. C. H. Maddox in the A-1 airplane piloted by Lieutenant Towers. The trailing wire antenna, reeled out after take-off, was found to be too weak, and no definite results were obtained.

26—Search for a shipboard launching device continued as Captain Chambers reported that the Bureau of Ordnance was interested in experimenting with a catapult for launching aeroplanes somewhat after the manner of launching torpedoes.

29—The aviators at Annapolis were ordered to transfer with their equipment to North Island, San Diego, to set up an Aviation Camp on land offered for the purpose by Glenn H. Curtiss.

1912

MARCH

9—Interest in steel and aluminum as aircraft structural materials was evident in a letter from Assistant Naval Constructor H. C. Richardson, who wrote to Captain Chambers, "From all I can gather, there is little doubt that much greater confidence would be felt if pontoons were constructed with a metal skin. . . . it would be unwise to make any requisition for such a construction until a practically standard design has been developed."

23—Chief Electrician Howard E. Morin conducted experiments with wireless at Mare Island Navy Yard in which he made transmissions from a dummy airplane fuselage hoisted to a height of 85 feet, which were received by a station at Point Richmond 20 miles distant.

MAY

22—1st LT. Alfred A. Cunningham, USMC, the first Marine Corps officer assigned to flight instruction and later designated Naval Aviator No. 5, reported to the Superintendent of the Naval Academy for "duty in connection with aviation" and subsequently was ordered to the Burgess Company at Marblehead for flight instruction.

JUNE

21—LT. T. G. Ellyson ascended 900 feet over Annapolis in 3 minutes and 30 seconds in the A-1.

JULY

20—Comparative tests of Wright steel wire and Monel wire were conducted at Engineering Experiment Station Annapolis by the Aviation Camp. These, the earliest recorded Navy tests of aircraft structural materials, showed the Monel wire to be both free of corrosion and 50 percent stronger than the steel wire.

25—AIRCRAFT SPECIFICATIONS—On the basis of the Navy's experience with its first airplanes, the Secretary of the Navy published "Requirements for Hydroaeroplanes," the first general specifications for naval aircraft. The purpose expressed by the Secretary was "to assist manufacturers in maintaining the highest degree of efficiency, while improving the factors which govern safety in aviation, without demanding anything that may not be accomplished under the limitations of the present state of the art and without confining purchases to the products of a single factory."

26—Tests of airborne wireless were continued at Annapolis using the Wright B-1 piloted by John Rodgers. On one flight, ENS. C. H. Maddox, who was giving technical assistance to the aviators, sent messages to the USS *Stringham* at a distance of about one and a half miles.

31—The Navy's first attempt to launch an airplane by catapult was made at Annapolis by LT. T. G. Ellyson in the A-1. The aircraft, not being secured to the catapult, reared at about mid-stroke, was caught in a cross wind and thrown into the water. The pilot was not injured. This catapult, which

Action to provide the Navy with a wind tunnel, a basic tool in aeronautical research and development, was approved formally by the Chief Constructor of the Navy. The resulting tunnel, which was built at the Washington Navy Yard, remained in operation until after the end of World War II.

MARCH

4—The Naval Appropriations Act for fiscal year 1914 provided an increase of 35 percent in pay and allowances for officers detailed to duty as flyers of heavier-than-air craft, limited to 30 the number of officers that could be so assigned, and further provided that no naval officer above the rank of Lieutenant Commander, or Major in the Marine Corps, could be detailed to duty involving flying.

5—As a result of tests held at Guantanamo 3–5 March, LT. J. H. Towers reported that submarines were visible from the air at depths of from 30 to 40 feet.

13—CAPT. W. I. Chambers was awarded the medal of the Aeronautical Society for the year 1912 and cited for "his unusual achievements in being the first to demonstrate the usefulness of the aeroplane in navies, in developing a practical catapult for the launching of aeroplanes from ships, in assisting in the practical solution of the hydroaeroplane by the production in association with others of the flying boat, in having been instrumental in the introduction into our halls of Congress of bills for a National Aerodynamic Laboratory, and a Competitive Test, and through his perseverence and able efforts in advancing the progress of Aeronautics in many other channels. . . ."

31—Aircraft instruments and allied equipment for installation in a new flying boat, the Burgess Company and Curtis D–1, were listed as: compass, altimeter, inclinometer, speed indicator, chart board, radio, and generator. Although the radio and generator were not installed, the remaining equipment was representative of instrumentation on naval aircraft of the period.

APRIL

10—Performance standards for qualification as a Navy Air Pilot and issuance of a certificate to all officers meeting the requirements, were approved by the Secretary of the Navy. They were described by Chambers as being different from those of the "land pilot" and more exacting than the requirements of the international accrediting agency, the Fédération Aéronautique Internationale.

28—Chief of the Bureau of Navigation, RADM. Victor Blue, approved a proposal that the Navy Department, Glenn Curtiss, and the Sperry Company cooperate in testing the gyroscopic stabilizer on a new Navy airplane.

MAY

9—President Wilson approved the designation of representatives of governmental departments to serve on an Advisory Committee for the Langley Aerodynamical Laboratory which had been reopened by the Smithsonian Institution on 1 May. Navy members of the Advisory Committee were CAPT. W. I. Chambers and Naval Constructor H. C. Richardson.

JUNE

12—Secretary of the Navy approved detailing Assistant Naval Constructor J. C. Hunsaker to the Massachusetts Institute of Technology to develop "a course of lectures and experiments on the design of aeroplanes and dirigibles, and to undertake research in that field." After making a tour of aeronautical research facilities in Europe, Hunsaker participated in establishing a course of aeronautical engineering at M.I.T., in the Department of Naval Architecture.

13—LT.(jg) P. N. L. Bellinger, flying the Curtiss A–3 at Annapolis, set an American altitude record for seaplanes, reaching 6,200 feet.

20—ENS. W. D. Billingsley, piloting the B–2 at 1,600 feet over the water near Annapolis, was thrown from the plane and fell to his death, the first fatality of naval aviation. LT. J. H. Towers, riding as passenger, was also unseated but clung to the plane and fell with it into the water, receiving serious injuries.

23—A General Order fixed the cognizance of various bureaus in aviation in a manner paralleling the division of responsibility for naval vessels.

AUGUST

30—A Sperry gyroscopic stabilizer (automatic pilot) was flight tested in the C–2 Curtiss flying boat by LT.(jg) P. N. L. Bellinger at Hammondsport N.Y.

30—In a report to the Secretary of the Navy, the General Board expressed its opinion that "the organization of an efficient naval air service should be immediately taken in hand and pushed to fulfillment."

20—Mr. A. B. Lambert of St. Louis informed the Secretary of the Navy that the services of the Aviation Reserve, which he had organized the year before, were available for use in the Mexican crisis and listed the names of 44 members, 20 of whom could furnish their own aircraft.

21—A second aviation detachment from Pensacola of 1 pilot, 3 student pilots, and 2 aircraft, commanded by LT. (jg) P. N. L. Bellinger, embarked in the USS *Mississippi* and sailed for Mexican waters to assist in military operations at Veracruz.

22—The Bureau of Navigation approved formal courses of instruction for student aviators and student mechanicians at the Flying School at Pensacola.

25—On the first flight by the USS *Mississippi* aviation unit at Veracruz, LT. (jg) P. N. L. Bellinger piloted the AB–3 flying boat to observe the city and make preliminary search for mines in the harbor.

28—LT. (jg) P. N. L. Bellinger and ENS. W. D. LaMont made a flight in the AB–3 flying boat to photograph the harbor at Veracruz.

MAY

2—The AH–3 hydroaeroplane, piloted by LT. (jg) P. N. L. Bellinger with ENS. W. D. LaMont as observer, flew the first mission in direct support of ground troops as the Marines, encamped near Tejar, reported being under attack and requested the aviation unit at Veracruz to locate the attackers.

6—The Curtiss AH–3 hydroaeroplane, piloted by LT. (jg) P. N. L. Bellinger with LT. (jg) R. C. Saufley as observer, was hit by rifle fire while on a reconnaissance flight over enemy positions in the vicinity of Veracruz—the first marks of combat on a Navy plane.

19—As the need for scouting services diminished at Veracruz, the aviation detachment resumed routine flight instruction while awaiting orders to return to Pensacola.

24—The aeronautic detachment on board the USS *Birmingham* arrived at Veracruz from Tampico to join the *Mississippi* detachment in the school routine of flight instruction.

26—On the basis of flight tests, Naval Constructor Holden C. Richardson recommended that the Navy buy two swept-wing Burgess-Dunne hydroaeroplanes "so that the advantages and limitations can be thoroughly determined and this more particularly as it appears to be only the beginning of an important development in aeronautical design." The aircraft which were subsequently obtained were designated AH–7 and AH–10.

JULY

1—Aviation was formally recognized with the establishment of an Office of Naval Aeronautics in the Division of Operations under the Secretary of the Navy.

28—LT. (jg) V. D. Herbster reported on bombing tests which he and LT. B. L. Smith, USMC, carried out at Indian Head Proving Grounds, Stumpneck, Md. Both dummy and live bombs were dropped over the side of the machine from about 1,000 feet against land and water targets. Herbster reported his bombing would have been more accurate "if I had been able to disengage my fingers from the wind-wheel sooner."

AUGUST

21—LCDR. H. C. Mustin, LT. P. N. L. Bellinger and 1st LT. B. L. Smith, USMC, arrived in Paris from the USS *North Carolina* for a 2-day tour of aircraft factories and aerodromes in the immediate area. This temporary assignment, the first use of naval aviators as observers in foreign lands, was a precedent for the assignment of aviation assistants to Naval Attachés, which began the same month when LT. J. H. Towers was sent to London. In September LT. (jg) V. D. Herbster and 1st LT. B. L. Smith reported to Berlin and Paris respectively.

NOVEMBER

16—An administrative reorganization at Pensacola shifted overall command from the station ship to headquarters ashore and the station was officially designated Naval Aeronautic Station, Pensacola.

23—The title "Director of Naval Aeronautics" was established to designate the officer in charge of naval aviation, and CAPT. Mark L. Bristol, already serving in that capacity, was ordered to report to the Secretary of the Navy under the new title.

25—To measure and record velocity and direction of winds, gusts, and squalls at the ends of the speed course at Pensacola, the Director of Naval Aeronautics, CAPT. M. L. Bristol, established requirements for special meteorological equipment to be installed there.

1915

FEBRUARY

1—The Division of Naval Militia Affairs in the Bureau of Navigation directed that an aeronautic

ority for aviation programs in the Navy partment to the Chief of Naval Operations and o the Bureaus. Although this had the effect of abolishing the Office of the Director of Naval Aeronautics, that office continued to exist until the detachment of the incumbent director.

15—The Secretary of the Navy referred a proposal, made by CAPT. Mark L. Bristol, to convert a merchant ship to operate aircraft, to the General Board with the comment that there was a more immediate need to determine what could be done with the USS *North Carolina*, already fitted to carry aeroplanes.

NOVEMBER

5—LCDR. H. C. Mustin, in the AB–2 flying boat, made the first catapult launching from a ship, flying off the stern of the USS *North Carolina* in Pensacola Bay.

DECEMBER

3—LT. R. C. Saufley, flying the Curtiss AH–14, set an American altitude record for hydroaeroplanes, reaching 11,975 feet over Pensacola and surpassing his own record of 11,056 feet which he had set only three days before.

1916

JANUARY

6—Instruction commenced for the first group of enlisted men to receive flight training at Pensacola.

11—The Naval Observatory forwarded two magnetic compasses to Pensacola for tests under all conditions. These compasses, modified from the British Creigh-Osborne design on the basis of recommendations by naval aviators, provided a model for the compasses widely used in naval aircraft during World War I.

21—In a step that led to the establishment of an aviation radio laboratory at Pensacola, the Officer in Charge of Naval Aeronautics requested the Superintendent, Radio Service, to authorize the radio operators at the Pensacola Radio Station to experiment with aircraft radio. Simultaneously, four sets of radio apparatus for aeroplanes were received at Pensacola. Although initiation of developmental work did not begin immediately, by late July an officer and a civilian radio expert had been detailed to aircraft radio experimentation at Pensacola and the Bureau of Steam Engineering had ordered approximately 50 aircraft radio sets.

MARCH

4—CAPT. Mark L. Bristol was detached as Director of Naval Aeronautics and both the title and the office ceased to exist. Captain Bristol was assigned to command the USS *North Carolina* and, under a new title of Commander of the Air Service, assumed operational supervision over all aircraft, air stations, and the further development of aviation in the Navy. Such aviation duties as remained in the Office of the Chief of Naval Operations were assumed by LT. C. K. Bronson.

29—LT. R. C. Saufley, flying a Curtiss hydroaeroplane at Pensacola, bettered his own American altitude record with a flight to 16,010 feet and on 2 April extended it again with a mark of 16,072 feet.

30—The Secretary of the Treasury informed the Secretary of the Navy that Second Lieutenant of Engineers C. E. Sugden and Third Lieutenant E. F. Stone of the Coast Guard had been assigned to flight instruction at Pensacola in accordance with an agreement between the two Departments.

MAY

13—The Chief of Naval Operations requested appropriate Bureaus to undertake development of gyroscopic attachments for instruments and equipment, including compasses, bombsights, and base lines, the latter being a forerunner of the turn and bank indicator.

20—Development of a gyroscopically operated bomb-dropping sight was initiated with the allocation of $750 to the Bureau of Ordnance to be used in placing an order with the Sperry Gyroscope Company.

22—The Naval Observatory sent a color camera, made by the Hess-Ives Corporation, to the Naval Aeronautic Station at Pensacola to determine whether color photography would be of value in aeronautic work.

JUNE

3—Formal instruction in free and captive balloons was instituted at Pensacola when the Secretary of the Navy approved a course proposed by LCDR. F. R. McCrary, and directed that it be added to the BuNav Circular "Courses of Instruction and Required Qualifications of Personnel for the Air Service of the Navy."

9—LT. R. C. Saufley, on an endurance flight in the AH–9 over Santa Rosa Island off Pensacola, crashed to his death after being in the air 8 hours and 51 minutes.

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27—The Chief of Naval Operations directed that all aircraft loaned or donated to the Naval Militia by private individuals or organizations be designated NMAH and be given numbers in sequence beginning with one.

NOVEMBER

8—LT. C. K. Bronson, Naval Aviator No. 15, and LT. Luther Welsh, on an experimental bomb test flight at Naval Proving Ground, Indian Head, Md., were instantly killed by the premature explosion of a bomb in their plane.

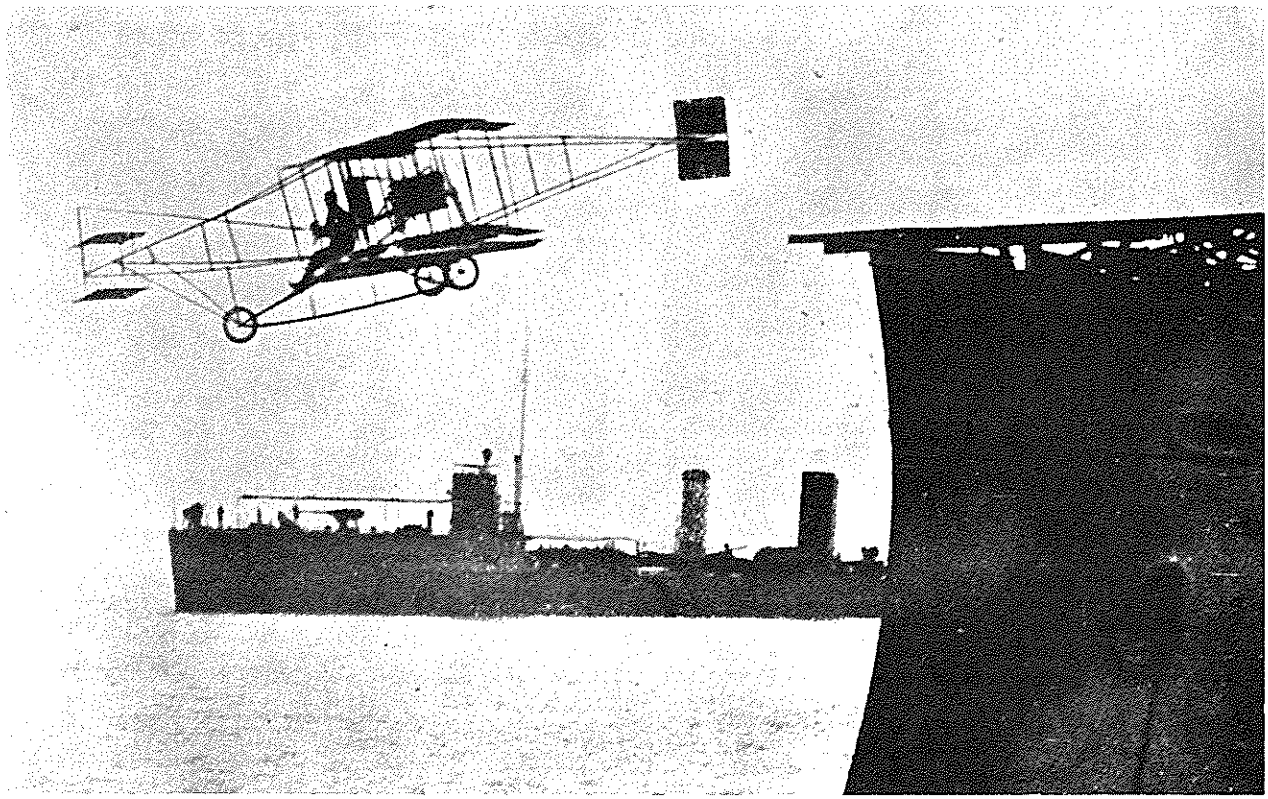
17—Efforts to develop high speed seaplanes for catapulting from ships led Chief Constructor David W. Taylor to solicit suitable designs from various manufacturers. Among the requirements were a speed range of 50 to 95 m.p.h., two and one half hours' endurance, and provisions for radio.

DECEMBER

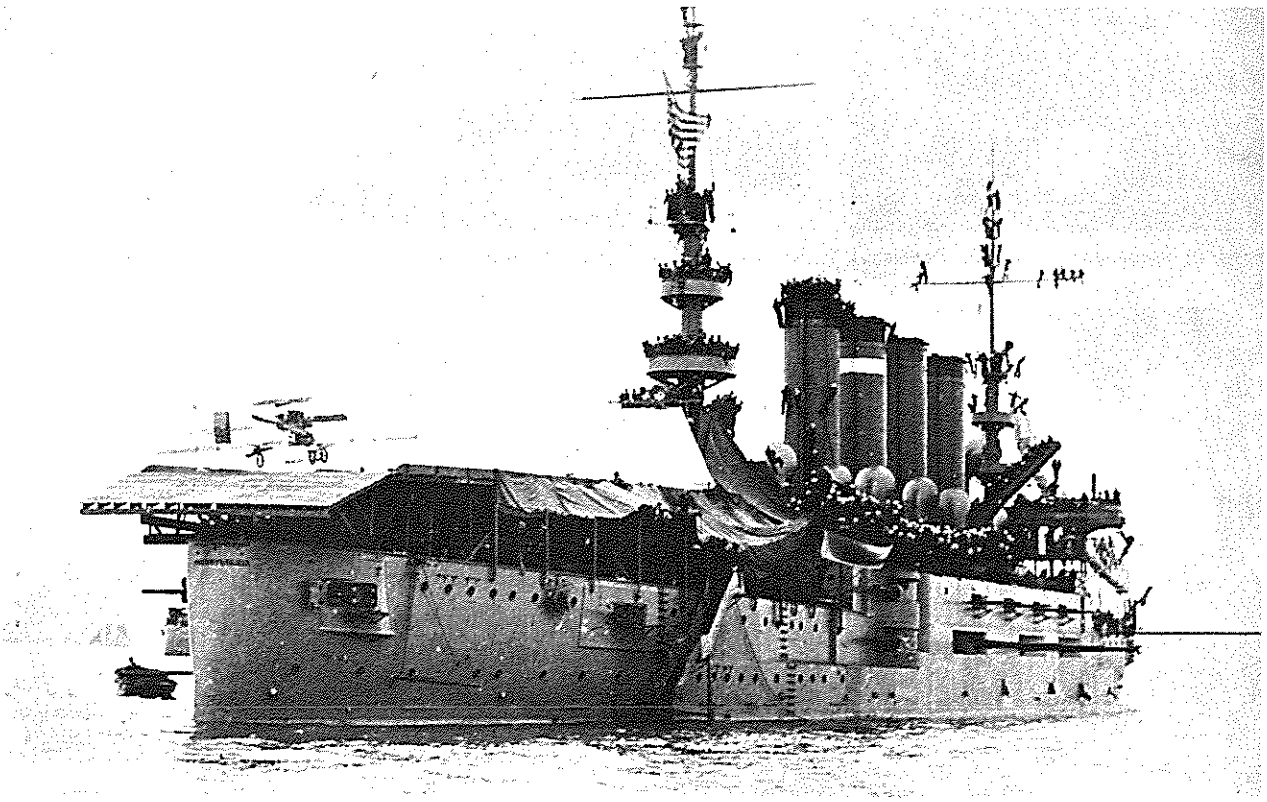
7—LCDR. H. C. Mustin reported that an Eastman Aero camera, tested at NAS Pensacola at altitudes of 600 to 5,100 feet, was by far the best camera tested up to that time, and produced photographs very satisfactory for military purposes.

12—CAPT. Mark L. Bristol was detached as Commander of the Air Service, and the functions of the Command but not the title were transferred to CAPT. Albert Gleaves, Commander Destroyer Force, Atlantic Fleet.

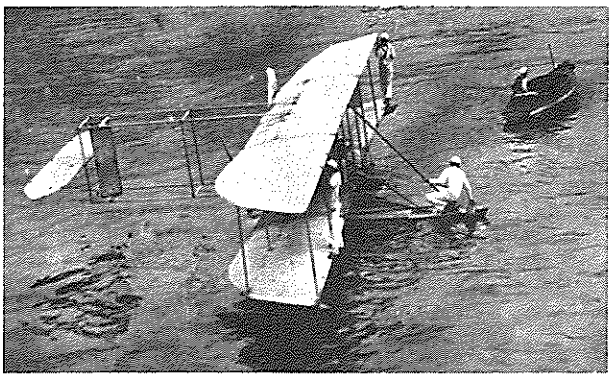
30—The Commission on Navy Yards and Naval Stations, authorized by the Act of 29 August 1916 for the purpose of selecting new sites for the expansion of Navy Yards and for submarine and air bases along the coast, submitted its preliminary report. For aviation the Commission could only report that "the present development of aeronautical machines . . . and the practical experience so far obtained in the utilization of such machines to meet the tactical and strategical requirements of the fleet and the defense of the coast, is such as to preclude the determination at this time of any extensive system of aviation bases," and recommended that a joint Army-Navy board decide upon locations that might be used by both services.



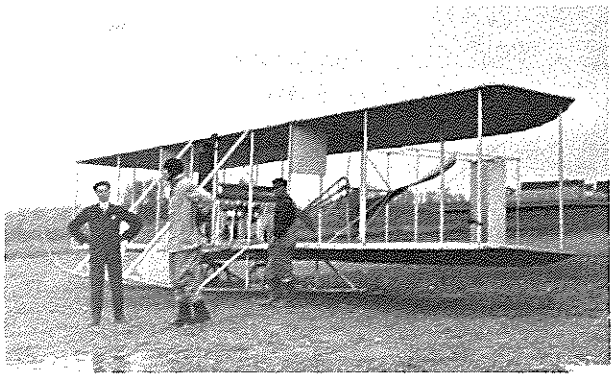
EUGENE ELY LEAVING THE USS BIRMINGHAM AT HAMPTON ROADS IN THE FIRST TAKEOFF FROM ANY SHIP, NOV. 14, 1910



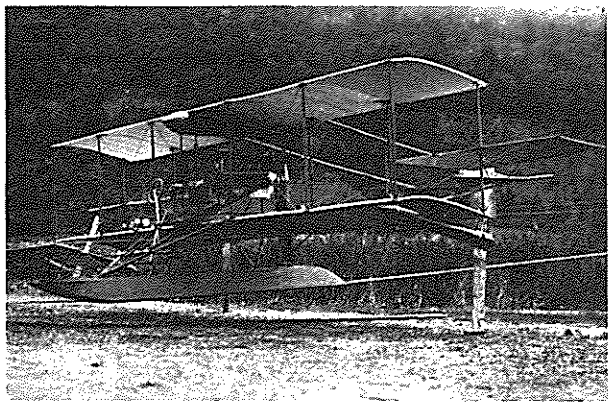
ELY IN A CURTISS BIPLANE COMES ABOARD THE USS PENNSYLVANIA IN THE FIRST SHIPBOARD LANDING, JANUARY 18, 1911



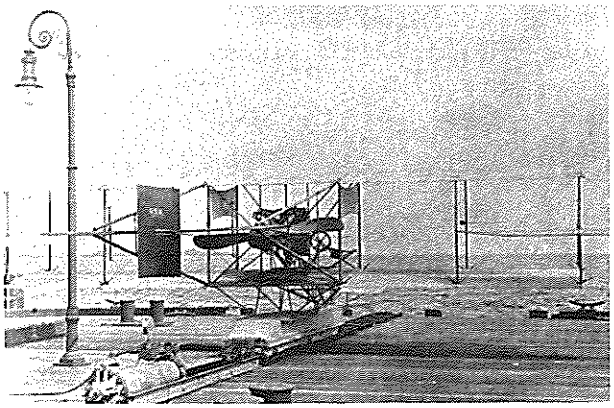
FIRST NAVY WRIGHT, B–1, AFTER INSTALLATION OF PONTOON



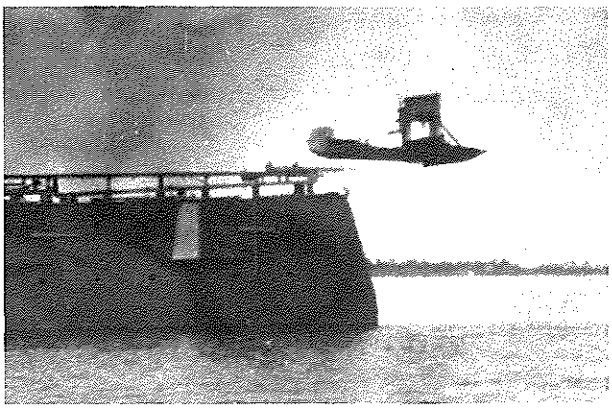
LT. RODGERS (C) AND ENS. HERBSTER (L) WITH WRIGHT B–1



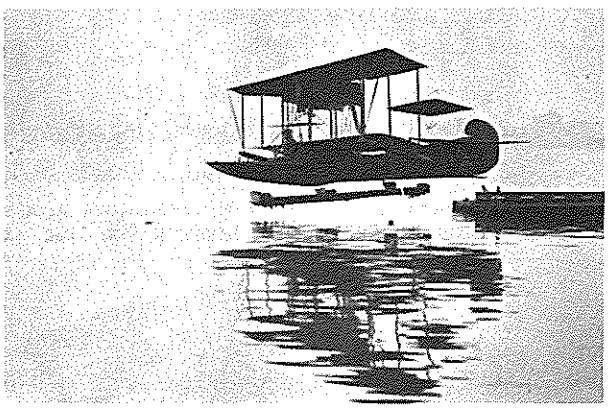
PREPARING A–1, FIRST NAVY PLANE, FOR LAUNCH FROM WIRE



A–1 ON THE NAVY'S FIRST CATAPULT, ANNAPOLIS, JULY 1912

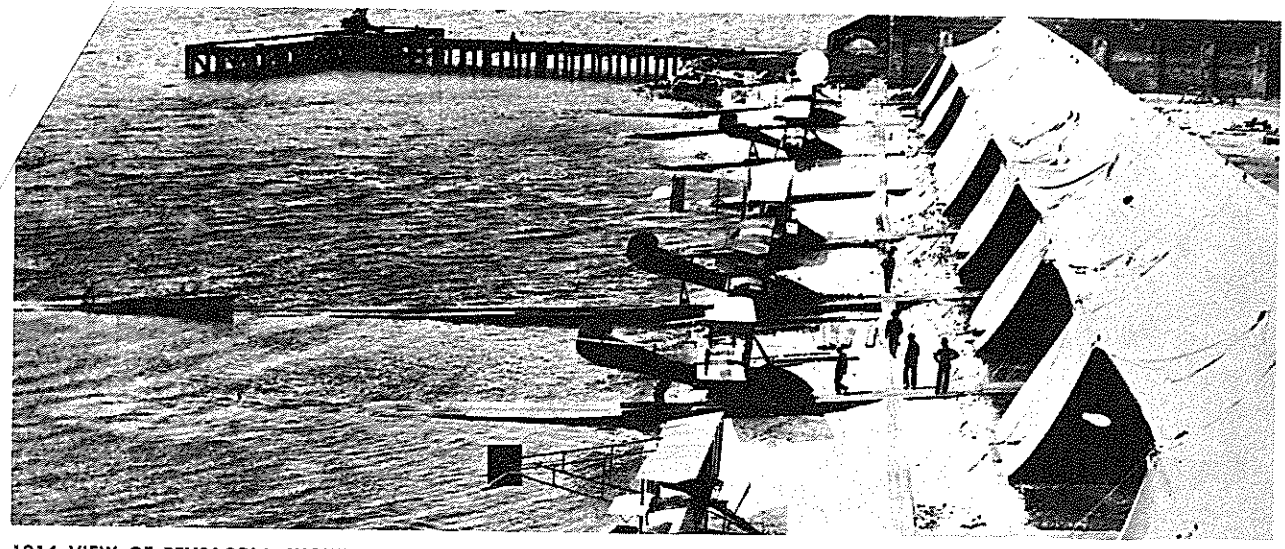


FIRST CATAPULT LAUNCH FROM SHIP, MUSTIN IN THE AB–2

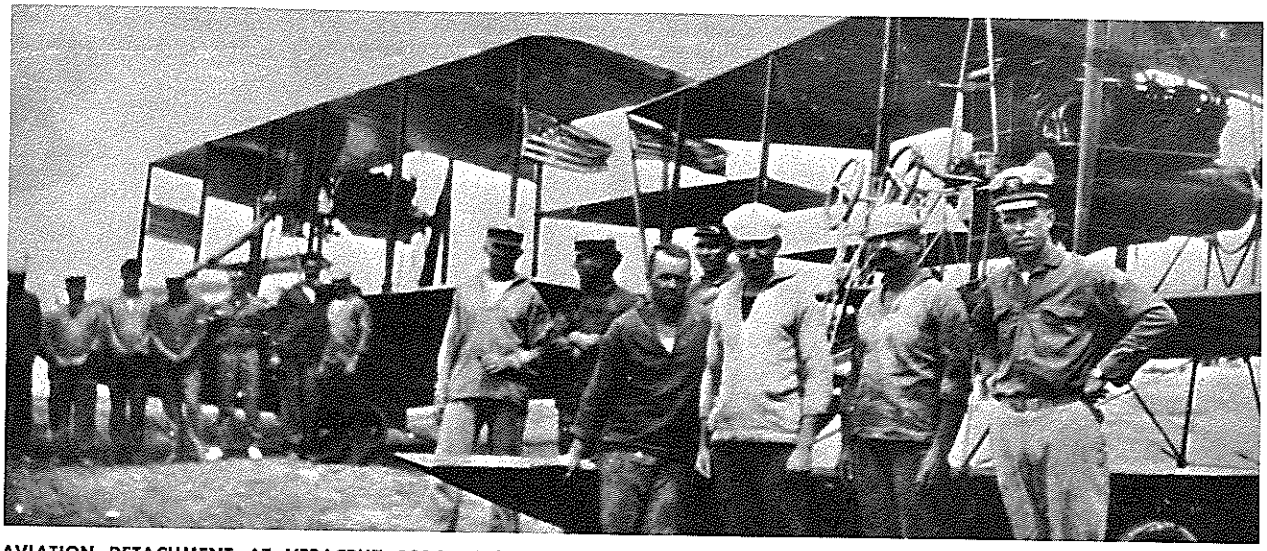


FIRST CATAPULT LAUNCH OF FLYING BOAT, WASHINGTON, D.C.

BASE FOR FIRST AVIATION OPERATIONS WITH FLEET ESTABLISHED AT FISHERMAN'S POINT, GUANTANAMO BAY, CUBA, JAN. 1913



1914 VIEW OF PENSACOLA SHOWING FLYING BOATS, HYDROAEROPLANES AND TENT HANGARS AT THE FIRST PERMANENT STATION



AVIATION DETACHMENT AT VERACRUZ 1914. BELLINGER (RIGHT) IN FRONT OF FIRST PLANE TO BE HIT BY HOSTILE GUNFIRE

GODFREY deC. CHEVALIER, AVIATOR NO. 7

H. C. MUSTIN, NAVAL AVIATOR NO. 11

W. MCILVAIN, USMC, AVIATOR NO. 12

PART II
TEST OF STRENGTH
1917–19

The small group of Navy and Marine Corps aviators whose enthusiasm and persistence had nurtured the early growth of aviation, was neither large enough nor well enough equipped to wage war. When the call came on 6 April 1917, only one air station was in operation, only 48 qualified aviators and student aviators were available, and only 54 aircraft were on hand none of which had been designed for the work that was now required.

In the 19 months between the declaration of war and the armistice, expansion was phenomenal. Air stations sprang up on both sides of the Atlantic. Training programs were set up at new stations, extended to the colleges and universities, and overflowed into industry. Thousands enrolled in the Naval Reserve Flying Corps became pilots, ground officers, mechanics, and technical specialists. Aircraft of many types were produced where none had been produced before, and a successful aircraft engine made the complete cycle from idea to drawing board to mass production to operation.

In spite of the speed and breadth of the expansion, naval aviation made a good record during the war. One of its units was the first from the United States to reach Europe. Twenty-seven bases in France, England, Ireland, and Italy and 12 in the United States were in use by naval air units at the end of the war. From them naval aircraft flew more than 3 million nautical miles of war patrols and attacked 25 U-boats, sinking or damaging a dozen of them. At the armistice, Navy and Marine Corps squadrons organized as the Northern Bombing Group, stood ready to launch a round-the-clock air campaign that would have been the first strictly American air offensive of the war.

Technically the outstanding product of the war was the long-distance flying boat. Numerous types appeared but they all bore the look of a single family. The design progressed through the HS–1 and H–16 to the F5L, the latter being an American adaptation of a British original and all could trace their ancestry to the earlier work of Glenn Curtiss. The culmination of this effort, the NC flying boats, arrived too late to take part in the war. A product of a triumvirate of Naval Constructors, a Yankee aircraft manufacturer, and New England yacht builders, one of these boats, the NC–4, made a trail-blazing flight across the Atlantic in May 1919 that dramatized the progress of naval aviation and gave some promise of its future prowess.

There were those in the Navy so impressed by the capabilities of flying boats that they urged adoption of this type as the major means of taking naval air power to sea. There were others still of the opinion that aircraft should fly from the combatant ships of the fleet. And lighter-than-air men, pointing to the successes of airships in the war, urged the development of their specialty. The logic of these claims and the usefulness of these aircraft types were not denied and there was development in each of these areas. But there was a broader and a growing opinion even as the war ended that was swinging toward the aircraft carrier, such as the Royal Navy was experimenting with, as a proper area of development. Authorization, given in 1919, to convert a collier to this type of ship, was a modest beginning to a program that would occupy the attention of a host of ship builders, aircraft designers, and naval tacticians for years to come, and would ultimately provide the Navy with an air arm stronger than the dreams of even the most enthusiastic aviator in the fleet.

mechanics. The program also provided for the selection of a few enlisted men for pilot training and qualification as quartermaster.

4—The Commandant of the First Naval District was directed to assume control of the Naval Militia station at Squantum, Mass., for use as an air training station. This was one of several actions taken immediately after the declaration of war to expand the air training program while stations of a more permanent nature were being constructed. Other enterprises brought under Navy jurisdiction in this early period included the Naval Militia station at Bay Shore, Long Island, the Curtiss Flying School at Newport News, where a Harvard unit was among those under training, the Goodyear balloon and dirigible training facilities at Akron, the Princeton Unit at East Greenwich, R.I., and Yale Units at West Palm Beach, Buffalo and Mastic, Long Island.

5—The Secretary of War agreed to a proposal of the Secretary of the Navy that a joint board be established for the purpose of standardizing the design and specifications of aircraft. The board, subsequently established, was originally titled "Joint Technical Board on Aircraft, except Zeppelins."

5—Pensacola reported on a test in which a Berthier machine gun, synchronized to fire through the propeller, was fired from a Curtiss R-3 taxiing on water and standing on the beach.

15—The Secretary established an order of precedence for work involved in the preparation for war which placed "aircraft and their equipment" ninth on a list of twenty major fields of material procurement.

16—The Aircraft Production Board was established by resolution of the Council of National Defense as a subsidiary agency to act in an advisory capacity on questions of aircraft production and procurement. Membership included a representative from each service, the Navy's being RADM. D. W. Taylor. Reconstitution of the Board by Act of Congress of 1 October 1917, transferred its control to the War and Navy Departments, enlarged its membership for greater service representation, and changed its title to Aircraft Board.

17—Aircraft Machine Gun Procurement—The Chief of Naval Operations requested purchase of 50 aircraft machine guns synchronized to fire through propeller and 50 for all-around fire.

17—CAPT. Noble E. Irwin was ordered to the Material Branch to relieve LT. J. H. Towers as officer in charge of the aviation desk in the Office of the Chief of Naval Operations.

19—The first United States national insignia for aircraft was described in a General Order and ordered placed on all naval aircraft. The design called for a red disc within a white star on a blue circular field, and for red, white, and blue vertical bands on the rudder, with the blue forward.

19—The Chief of Naval Operations requested that two small seaplanes and one pilot be detailed for duty in connection with radio experimentation at Pensacola.

23—The initial production program to equip the Navy with the aircraft necessary for war was recommended by the Joint Technical Board on Aircraft, to consist of 300 school machines, 200 service seaplanes, 100 speed scouts, and 100 large seaplanes. The N-9 and R-6 were listed as the most satisfactory for school and service seaplanes, but the remaining two types were not sufficiently developed to permit a selection.

30—The Navy's first successful dirigible, the B-1, landed in a meadow 10 miles from Akron, Ohio, completing an overnight test flight from Chicago. The B-1 was manufactured at Akron by Goodyear, assembled in Chicago, and piloted in this flight by Goodyear pilot, R. H. Upson.

JUNE

4—The construction of five prototype models of 8- and 12-cylinder Liberty motors was authorized by the Aircraft Production Board and the Joint Technical Board on Aircraft. The design of these engines, based on conservative engineering practices especially adapted to mass production techniques, had been worked out in a room in a Washington hotel by J. G. Vincent of the Packard Motor Car Company and E. J. Hall of the Hall-Scott Motor Car Company, commencing on 29 May.

5—The first U.S. military unit sent to Europe in World War I, the First Aeronautic Detachment, arrived in Pauillac, France, aboard the USS *Jupiter*. The Detachment, consisting of 7 officers and 122 enlisted men, including the element aboard the USS *Neptune* which arrived at St. Nazaire on 8 June, was commanded by LT. Kenneth Whiting. Offloading was completed by 10 June.

14—The establishment of patrol stations along the Atlantic coast was implemented as the first contract for base construction was let. The contract covered sites on Long Island located at Montauk, Rockaway and Bay Shore.

OCTOBER

6—The Secretary of War authorized the Navy to use a part of the Army landing field at Anacostia for the erection and maintenance of a seaplane hangar. Terms of use were within those of a revokable license and with the understanding that the Army might have joint use of the Navy area at any time. In the following January, the Naval Air Station Anacostia was established to provide a base for short test flights, to provide housing and repair services for seaplanes on test flights from NAS Hampton Roads and the Army station at Langley Field, and to set up new seaplane types for study by those responsible for their construction and improvement.

14—The Marine Aeronautic Company at Philadelphia was divided into the First Aviation Squadron, composed of 24 officers and 237 men, and the First Marine Aeronautic Company, composed of 10 officers and 93 men. On the same day, the First Marine Aeronautic Company transferred to the Naval Air Station at Cape May, N.J., for training in seaplanes and flying boats and on 17 October the First Aviation Squadron transferred to the Army field at Mineola, Long Island, for training in landplanes.

21—FIRST FLIGHT TEST OF LIBERTY ENGINE—The 12-cylinder Liberty engine was successfully flown for the first time in a Curtiss HS-1 flying boat at Buffalo, N.Y. This flight and other successful demonstrations led to the adoption of both the engine and the airplane as standard service types.

24—The first organization of U.S. Naval Aviation Forces, Foreign Service, which had evolved from the First Aeronautic Detachment, was put into operation as CAPT. H. I. Cone relieved LCDR. K. Whiting of command over all naval aviation forces abroad.

24—Routine instruction in flight and ground courses began at NAS Moutchic, France, established as a training station serving naval air units in Europe.

NOVEMBER

5—To coordinate the aviation program, CAPT. N. E. Irwin, Officer in Charge of Aviation, requested that representatives of bureaus having cognizance over some phase of the program meet regularly each week in his office for the purpose of discussing and expediting all matters pertaining to aviation.

9—Permission was received from the Argentine Government to use three Argentine Naval Officers, recently qualified as U.S. Naval Aviators, as instructors in the ground school at Pensacola.

10—A Navy "flying bomb," manufactured by the Curtiss Company, was delivered to the Sperry Flying Field at Copiague, Long Island, for test. The flying bomb, or aerial torpedo as it was called earlier, was designed for automatic operation, carrying 1,000 pounds of explosive. Its range was specified as 50 miles, and its top speed as 90 miles an hour. In addition to this specially designed aircraft, N-9's were also converted into automatic airplanes as part of the Navy flying bomb project, closely related to the guided missile of today.

14—A major step in assuring the success of the Navy's World War I aircraft production program was taken when the Secretary of War, Newton D. Baker, approved a recommendation "that priority be given by the War Department to naval needs for aviation material necessary to equip and arm seaplane bases."

15—A Committee on Light Alloys, with Naval Constructor J. C. Hunsaker a member, was established within the NACA to intensify efforts to develop light metal alloys for aeronautical use.

18—U.S. aerial coastal patrols in European waters began with Tellier seaplanes from LeCroisic at the mouth of the Loire River. This seaplane patrol station, the first of eight established in France, was commissioned 27 November under command of LT. W. M. Corry.

21—A demonstration of the Navy N-9 flying bomb at Amityville, Long Island, which was witnessed by MAJ. GEN. George O. Squier, USA, Chief Signal Officer, led the Army to establish a parallel aerial torpedo project.

24—In discussing the development of aircraft torpedoes and torpedoplanes, the Chief of Naval Operations pointed out that of the two types of aircraft available, the H-16 could not carry torpedoes weighing more than 600 pounds, while the HS-1 was limited to 500-pounders. The explosive charge in torpedoes of these sizes would be much less than the 400 pounds required to seriously damage a modern warship. This problem, the size of torpedo versus the size of aircraft, retarded torpedoplane development in World War I and continued as a factor of importance until World War II.

DECEMBER

1—Naval Air Station, Pauillac, was placed in commission as an assembly and repair station supporting all naval air units in France.

vanced specialization courses; and designated the stations at which the respective courses would be given.

19—As combat operations underlined the need for Aviation Intelligence Officers, Commander Naval Aviation Forces, Foreign Service, distributed a circular letter defining the duties and functions performed by such officers at Royal Navy Air Stations with the suggestion that provisions for similar services be made at Naval Air Stations "as may seem expedient." Supplementary letters clarified the duties and functions and on 31 October it was specifically stated that Aviation Intelligence Officers be specially trained for this work.

19—A formation of flying boats, on long range reconnaissance of the German coast, was attacked by German seaplanes. ENS. Stephan Potter shot down one of the attackers and was officially credited as being the first American naval aviator to shoot down an enemy seaplane.

21—The HA seaplane, or "Dunkirk Fighter," made its first flight at Port Washington, Long Island, with Curtiss test pilot Roland Rohlfs at the controls and CAPT. B. L. Smith, USMC, occupying the second seat.

27—The first aircraft built at the NAF, the H–16, Serial No. A–1049, was flown for the first time. The H–16 was used in antisubmarine patrol from U.S. and European stations, and for this purpose was equipped with two 230-pound bombs and five Lewis machine guns; one forward, two aft, and two amidships.

30—The Curtiss 18–T or "Kirkham" triplane fighter was ordered from Curtiss Engineering Corporation. This single-engine, two-seater landplane was fitted with two synchronized and two flexible guns.

APRIL

15—The First Marine Aviation Force, commanded by CAPT. A. A. Cunningham, was formed at Naval Air Station, Miami, from personnel of the First Aviation Squadron and the Aeronautic Detachment, USMC, both of which had disbanded the day before. A Headquarters Company and four squadrons designated A, B, C and D, were organized within this Force on 16 June and it later transferred overseas to operate as the Day Wing of the Northern Bombing Group.

17—LT. W. F. Reed, Jr., reported at NAS Pensacola for what was then called "Aerographical" duty, the first such assignment ever made to a naval air station.

23—LIBERTY MOTORS IN FRANCE—The first overseas shipment of Liberty motors arrived at the assembly and repair station at Pauillac, France.

27—The airship AT–1, commanded by LT. F. P. Culbert, completed a 25-hour 43-minute flight out of Paimboeuf, France, during the course of which three convoys were escorted through a mined zone. For their flight, the longest on record for an airship of the type, the commanding officer and crew were officially commended by the French Minister of Marine.

30—NORTHERN BOMBING GROUP—The Secretary of the Navy approved a plan, recommended by the General Board and developed by U.S. Naval Forces in Europe, for air operations to be undertaken in the Dunkirk-Zeebrugge region against German submarine support facilities by a specially organized unit later designated the Northern Bombing Group, and directed that bureaus and offices expedite assembly of the necessary personnel and equipment.

MAY

6—The Naval Air Station Coco Solo was commissioned, LT. R. G. Pennoyer commanding, to maintain patrols over the seaward approaches to the Panama Canal.

15—The Bureau of Steam Engineering reported that the Marconi SE 1100 radio transmitter, designed for use on the H–16 flying boat, had proven capable of dependable voice communications from plane to shore up to 50 nautical miles and code communications up to 120 nautical miles. This was one of the first radio sets to be widely used aboard naval aircraft and the first tube set developed for use in naval aircraft.

18—The Chief of Naval Operations set training goals to provide pilots for foreign service, and to meet them, directed that eight elementary training squadrons be operated, two at Key West, four at Miami, and two at Bay Shore; that elementary training at Pensacola be discontinued as soon as students on board were graduated; and that six advanced training squadrons be organized there to begin training patrol plane and night bomber pilots as soon as practicable.

24—The first consignment of American-built flying boats, six HS–1's aboard *USS Houston* and two aboard *Lake Placid*, arrived at Pauillac, France.

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catapult by the Sperry Company had been undertaken in connection with the Bureau of Ordnance flying bomb project.

23—The Aircraft Radio School at Pensacola began a course of instruction for Aircraft Radio Electricians which included code work, semaphore and blinker study, gunnery, and laboratory work. This school, established in recognition of the fact that unsatisfactory operation of aircraft radio apparatus was partially attributable to the use of inexperienced radio operators, was subsequently transferred to Harvard University.

24—LT. (jg) David S. Ingalls, while on a test flight in a Sopwith *Camel*, sighted an enemy two-seat *Rumpler* over Nieuport. In company with another *Camel* he attacked and scored his fifth aerial victory in six weeks to become the Navy's first Ace. For this and other meritorious acts while serving as a fighter pilot with RAF Squadron 213, he was awarded the Distinguished Flying Cross by the British Government and the Distinguished Service Medal by the President of the United States.

OCTOBER

1—Some of the earliest recorded food-dropping missions were flown by Marine Corps pilots CAPT. Francis P. Mulcahy, CAPT. Robert S. Lytle, and LT. Frank Nelms. On this day and the next they made repeated low level runs in the face of enemy fire and delivered 2,600 pounds of food and badly needed supplies to a French regiment surrounded by German troops near Stadenburg.

4—The first of the NC flying boats, the NC–1, made its initial flight at NAS Rockaway with CDR. H. C. Richardson, CC, and LT. David H. McCulloch pilots.

14—The first raid-in-force by the Northern Bombing Group in World War I, was made by eight planes of Marine Day Squadron 9, which dropped 17 bombs totaling 2,218 pounds on the German held railroad junction at Thielt Rivy, Belgium. For extraordinary heroism on this and on an earlier raid in engaging enemy aircraft at great odds, 2d LT. Ralph Talbot, and his observer, Gunnery Sgt. Robert G. Robinson, were later awarded the Medal of Honor.

17—A pilotless N–9 training plane, converted to an automatic flying machine, was successfully launched at Copiague, Long Island, and flew a prescribed course, although the distance gear failed to land the airplane at a preset range of 14,500 yards. The plane was last seen over the Bay Shore Air Station at an altitude of 4,000 feet, flying straight to eastward.

22—The twin-engine dirigible C–1, commanded by MAJ. B. L. Smith, USMC, and with crew consisting of LT. R. A. D. Preston, USNRF, LT. (jg) D. T. Hood, USNRF, ENS. W. L. Hamlin, USNRF, ENS. M. H. Estorly, USNRF, and two civilian mechanics, M. Roulette and James Royal, was delivered at NAS Rockaway, having flown that day from Akron, Ohio, via Washington, D.C. The Aero Club of America later awarded Smith and Hamlin its Medal of Merit for this flight.

NOVEMBER

11—An armistice was signed ending the hostilities of World War I. In the 19 months of United States participation, the strength of Naval Aviation had grown to a force of 6,716 officers and 30,693 men in Navy units, and 282 officers, 2,180 men in Marine Corps units, with 2,107 aircraft, 15 dirigibles, and 215 kite and free balloons on hand. Of these numbers 18,000 officers and men and 570 aircraft had been sent abroad.

17—NAS Hampton Roads reported that an H–16 flying boat, equipped with a radio direction finder using the British six-stage amplifier, received signals from the Arlington, Va., radio station at a distance of 150 miles.

22—LT. Victor Vernon and Mr. S. T. Williams dropped a 400-pound dummy torpedo from an F–5–L at Naval Aircraft Factory in the initial test of a torpedo launching gear upon which development had begun the preceding July.

23—Use of the titles "Navigation Officer" and "Aerographic Officer," as descriptive of the duties performed at Naval Air Stations by officers trained in these two specialities, was authorized by the Office of the Chief of Naval Operations.

25—The NC–1 took off from Rockaway Beach, N.Y., with 51 persons aboard, establishing a new world record for persons carried in flight.

DECEMBER

2—Efforts to develop aircraft to operate from ships were renewed by the Office of the Chief of Naval Operations' request that the Bureau of Construction and Repair provide aircraft of the simplest form, lightly loaded, and with the slowest flying speed possible.

12—In a test to determine the feasibility of carrying fighter aircraft on dirigibles, the C–1 lifted an

APRIL

7—The Seaplane Squadron and USS *Shawmut* of Fleet Air Detachment left Guantanamo for the United States after almost seven weeks' participation in fleet exercises, during which time the squadron had operated entirely afloat and had no support from shore bases.

8—CAPT. Thomas T. Craven was detached from the the Bureau of Navigation for duty in the Office of the Chief of Naval Operations where, in the following month, he relieved CAPT. N. E. Irwin as Director of Naval Aviation.

10—The roll-up of Naval Air Stations in Europe, which had begun on 31 December 1918 with the the decommissioning of Porto Corsini, Italy, was completed as the Assembly and Repair Base at Eastleigh was demobilized.

26—An F5L flying boat, equipped with two 400-hp Liberty engines and piloted by LT. H. B. Grow out of Hampton Roads, completed a flight of 20 hours and 19 minutes in which it covered 1,250 nautical miles. Although the flight was not made under FAI supervision and was prior to the date on which seaplanes were recognized as a separate class for record purposes, this time was better than any recognized seaplane duration record until May 1925.

28—LCDR. R. E. Byrd, who developed and tested navigational equipment for the forthcoming transatlantic flight, requested the Naval Observatory to supply bubble levels which he adapted for attachment to navigational sextants, thereby providing an artificial horizon which made it possible to use these instruments for astronomical observations from aircraft.

MAY

14–15—The airship C–5, LCDR. E. W. Coil commanding, made a record flight from Montauk Point, Long Island, to St. Johns, Newfoundland, covering the 1,050 nautical miles in 25 hours and 50 minutes.

16—Some four hours after the NC–4 took to the air from Trepassey Bay enroute to the Azores, the radio operator, ENS. H. C. Rodd, intercepted a radio message from the steamship *George Washington*, 1,325 miles distant. A radio message from one of the NC's was also intercepted by the radio station, Bar Harbor, Maine, when the plane was 1,400 miles away.

27—At 8:01 p.m. the NC–4 landed in the harbor at Lisbon, Portugal, completing the first crossing of the Atlantic Ocean by air. Three NC flying boats left Trepassey Bay, Newfoundland, on the night of 16 May but only the NC–4 succeeded in reaching the Azores by air. She arrived the afternoon of the 17th and, after a layover of 10 days, covered the last leg of the crossing to Lisbon. LCDR. A. C. Read commanded the NC–4, and LT. E. F. Stone, USCG, LT. J. L. Breese, LT. (jg) W. K. Hinton, ENS. H. C. Rodd, and CMM. E. S. Rhoads made up the crew. The three planes departed from NAS Rockaway on 8 May and the NC–4 flight terminated at Plymouth, England, on 31 May.

JUNE

12—A contract was issued for the construction of a revolving platform at Hampton Roads for use in experimental development of techniques and equipment for landing aircraft aboard ship.

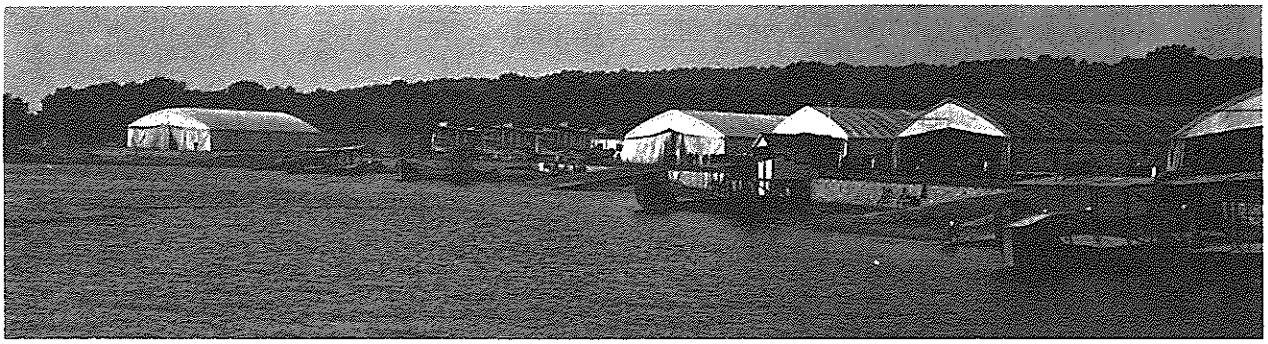
23—The General Board submitted the last of a series of reports to the Secretary on a policy for developing a naval air service. On the conclusion that aviation had become an essential arm of the Fleet, the Board urged adoption of a broad program for peacetime development that would establish a naval air air service "capable of accompanying and operating with the fleet in all waters of the globe." Approved with some modification by the Secretary on 24 July, this program provided the direction for a number of actions taken in the following months.

25—NAS Anacostia reported experiments in which aircraft carried aloft instruments to measure temperature and humidity of the upper atmosphere.

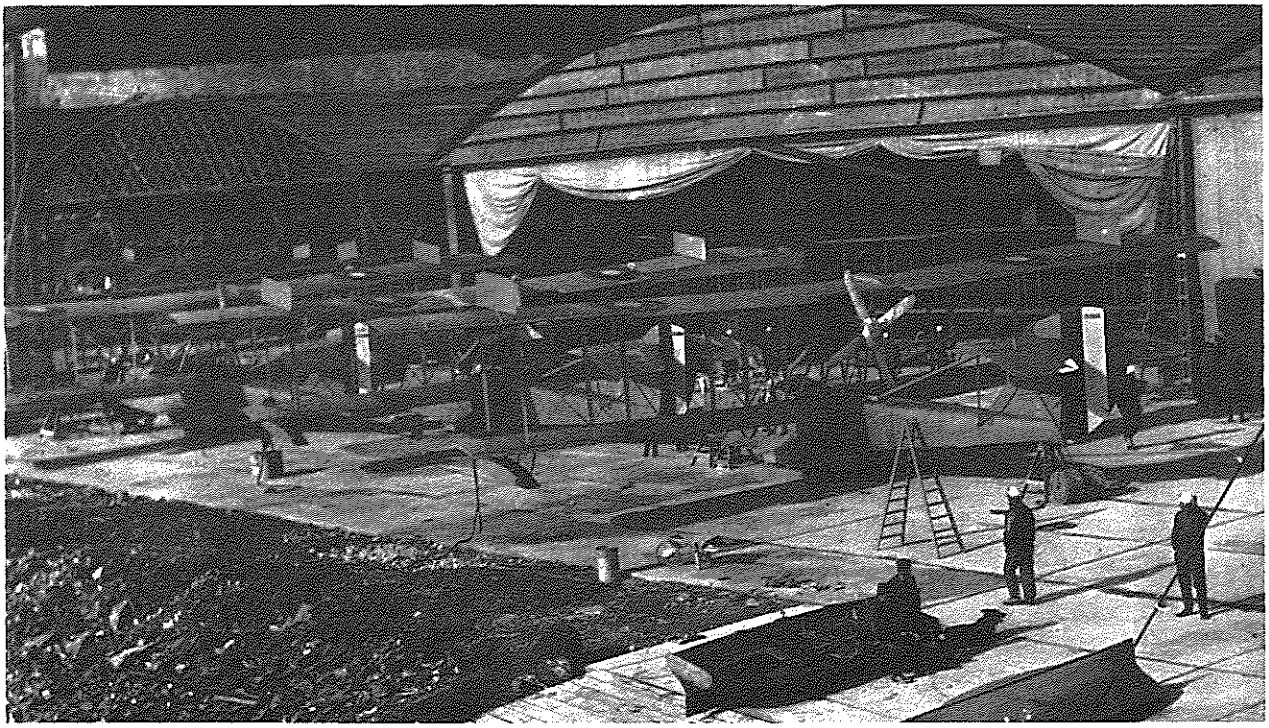
JULY

1—The decision to equip some fleet units with aircraft was reflected in the authorization of the Secretary of the Navy to install two launching platforms on two main turrets in each of eight battleships.

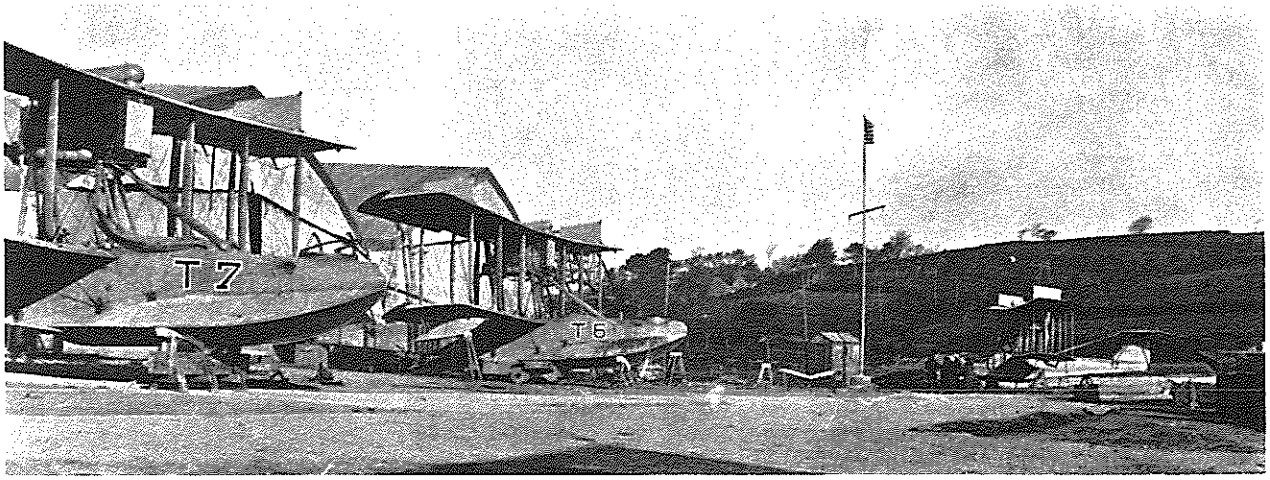
11—The Naval Appropriations Act for fiscal 1920 made several important provisions for the future of of naval aviation. Among others it provided for conversion of the *Jupiter* into an aircraft carrier, for conversion of two merchant ships into seaplane tenders, for construction of one rigid dirigible and purchase of another from abroad. In a more restrictive sense, the Act limited to six the heavier-than-air stations that could be maintained along the coasts of continental United States.



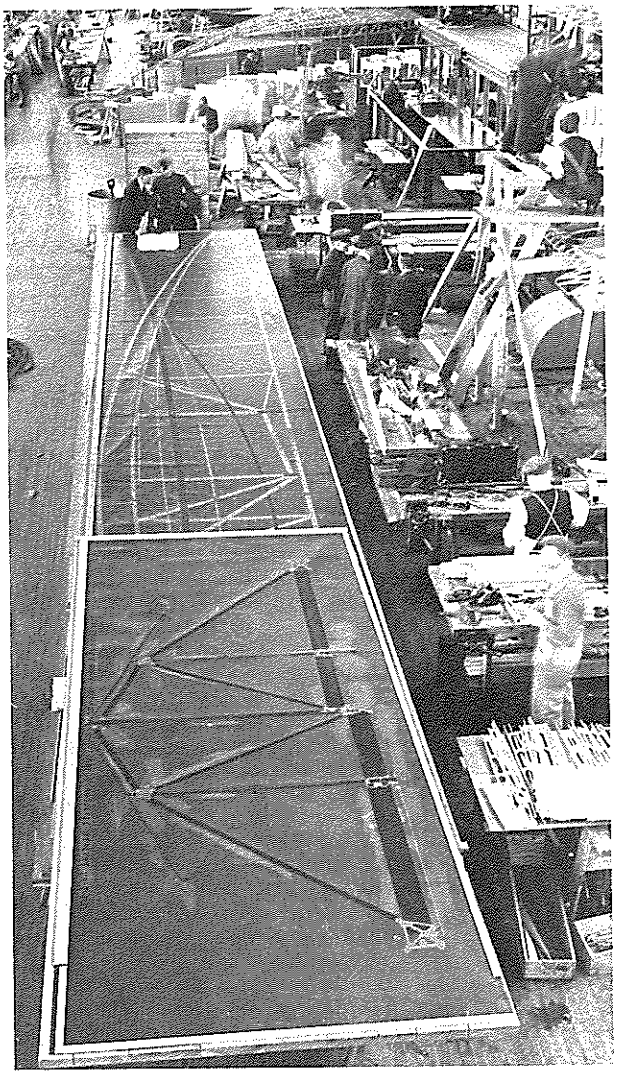
AMERICAN BUILT HS FLYING BOATS MOORED AT NAVAL AIR STATION MOUTCHIC, ONE OF THE MAIN TRAINING BASES IN FRANCE



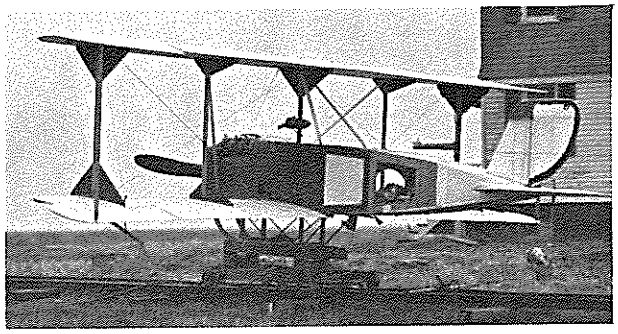
HS FLYING BOATS AT NAVAL AIR STATION BREST, ONE OF TWO RECEIVING AND ASSEMBLY PLANTS ESTABLISHED IN FRANCE



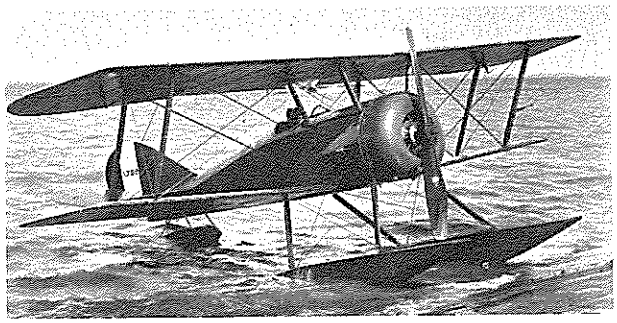
NAVAL AIR STATION AT TREGUIER, FRANCE, SHOWING HS–1 FLYING BOATS USED IN AERIAL PATROL OVER THE ENGLISH CHANNEL



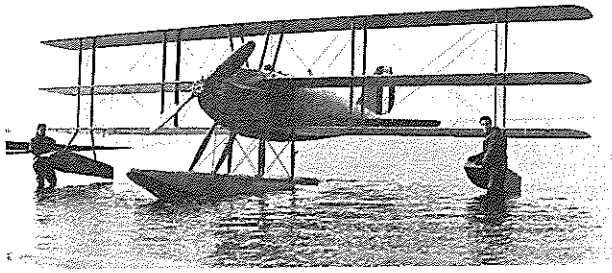
INTERIOR VIEW OF NAVAL AIRCRAFT FACTORY, APRIL 1918



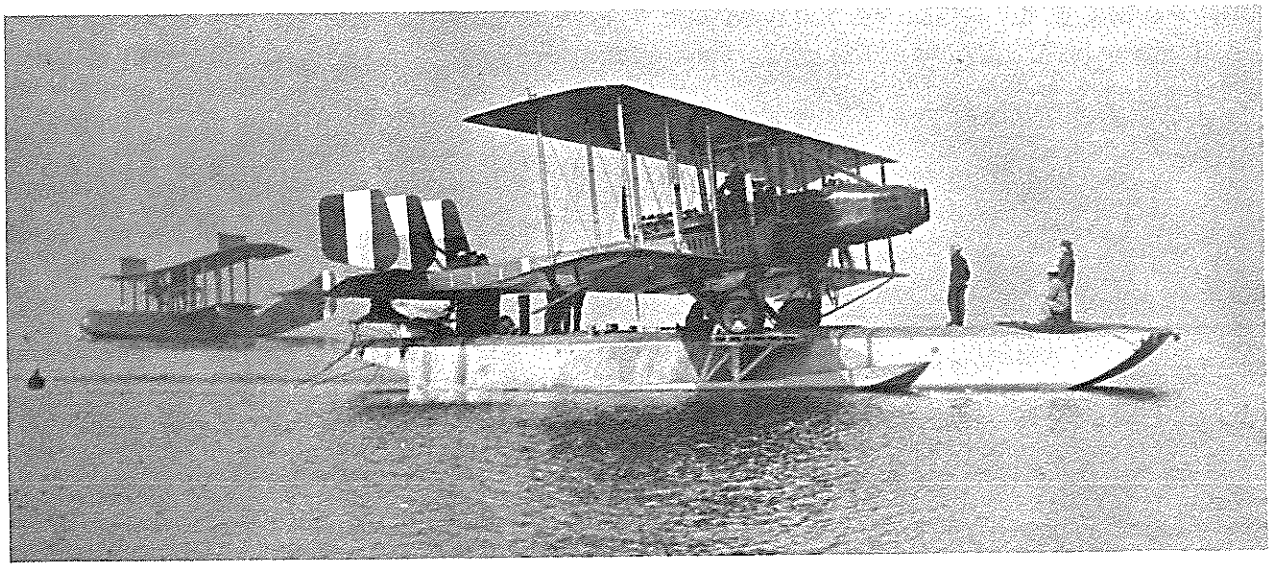
ANCESTOR OF THE GUIDED MISSILE, A WW I FLYING BOMB



THOMAS-MORSE S–5 POWERED WITH GNOME ROTARY ENGINE

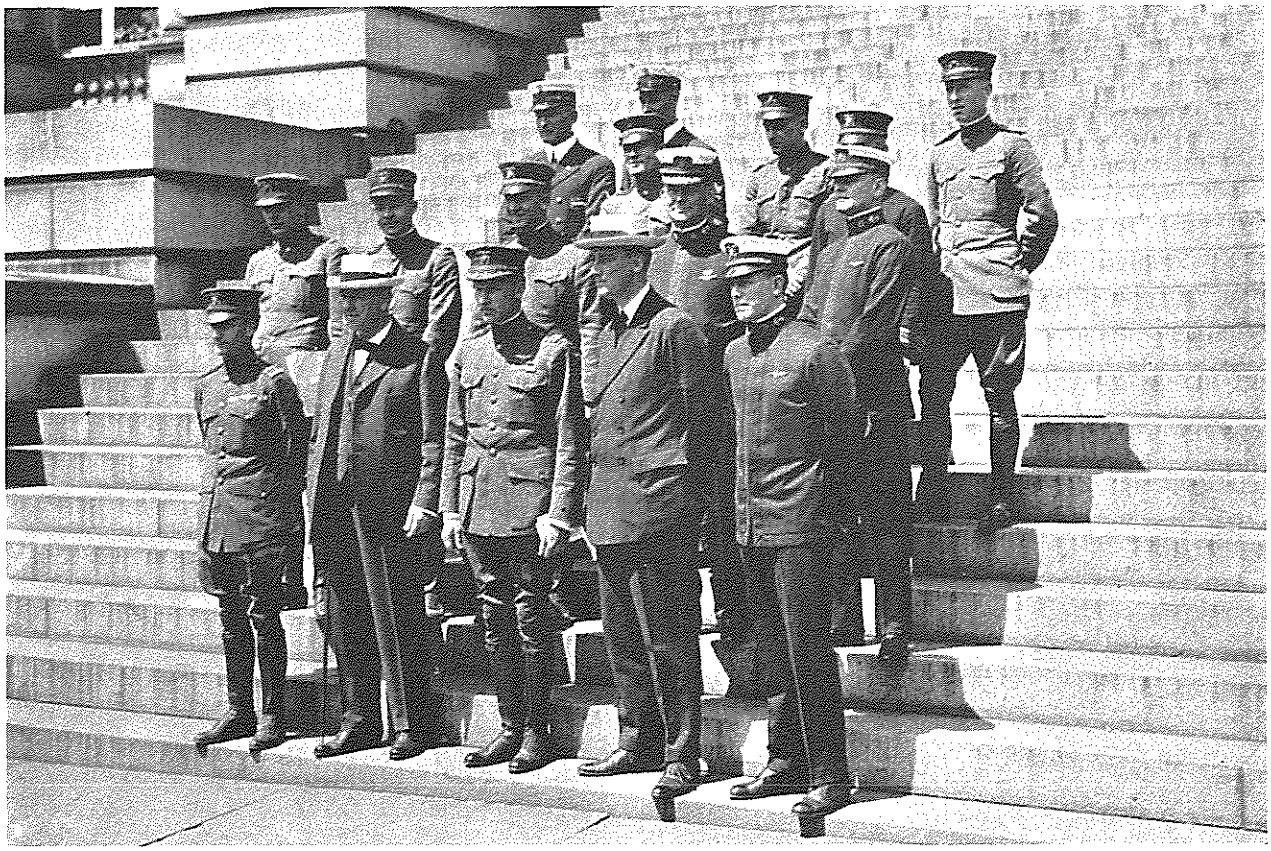


CURTISS (KIRKHAM) 18–T EXPERIMENTAL TRIPLANE FIGHTER



SEA SLED, A HIGH SPEED BOAT FOR TRANSPORTING AND LAUNCHING BOMBERS. CAPRONI LANDPLANE ON BOARD, NOVEMBER 1918

CREW OF THE NC–4—1ST LT E. F. STONE, USCG, CMM E. C. RHOADS, LT(JG) WALTER HINTON, ENS H. C. RODD, LT J. L. BREESE, LCDR A. C. READ—WITH CAPT R. H. JACKSON



SECNAV AND ASST WITH TRANS-ATLANTIC FLIERS (1) READ, SECNAV DANIELS, TOWERS, ASST SECNAV ROOSEVELT, BELLINGER (2) RODD, SADENWATER, BARIN, RICHARDSON, MCCULLOCH, (3) BREESE, LAVENDER (4) RHOADS, CHRISTENSON, STONE, HINTON

PART III
THE TWENTIES
1920–29

The twenties stand out in the history of naval aviation as a decade of phenomenal growth. There was a steady increase in the size of the air arm and its power capability, and great improvement in its position in both the administrative and operational organization of the Navy. The period began under the leadership of a Director without authority to direct, and ended with representation in the Office of the Secretary and a flourishing Bureau of Aeronautics. At the beginning, a small air detachment in each ocean fleet owed its existence to a decision to give aviation the chance to prove itself under the practical conditions of operating at sea. At the end, three aircraft carriers were in full operation, patrol squadrons and seaplane tenders were performing essential scouting functions, aircraft were regularly assigned to battleships and cruisers, and together these elements were playing an important role in the offensive and defensive maneuvers of the annual fleet war games.

The period was also characterized by impressive technical progress. With comparatively slim funds, the radial air cooled engine was developed into an efficient and reliable power plant. Better instruments and more satisfactory radios were put into use; an accurate bombsight was developed. Aircraft equipped with oleo struts and folding wings enhanced the operating capability of aircraft carriers. Aircraft flew faster, higher, and longer each year and of the many world records placed on the books, a fair share of them were put there by naval aircraft.

The turntable catapult, powered first by compressed air and later by powder, increased the effectiveness of battleship and cruiser operations. Lighter-than-air blossomed forth in the glory of large rigid dirigibles.

Tactics were developed. Dive bombing emerged as an established fact almost before anyone knew enough about it to call it by name. Marine Corps expeditionary troops learned through experience the value of air support. The techniques of torpedo attack, scouting, spotting for gunfire, and operating from advanced bases, were investigated and learned. The skills of naval pilots turned the airplane to new uses in polar exploration and photographic survey. Everywhere it was evident that the Navy was solving its basic and unique problem of taking aviation to sea.

But the period was also one of controversy, discussion and dispute. Newspapers reported angry statements by the proponents of air power and the equally virulent retorts of its opponents. There were charges of duplication and inefficiency; of prejudice and jealousy. There was discussion over the role of air power, over the mission of the services in coast defense, and indeed over the further need for a Navy. The battleship was enthusiastically consigned to the bottom of the sea and just as enthusiastically raised again. There was agitation for a separate department for air and for the separation of aviation from the Navy. Aviators were unhappy with their career limitations and their lack of command responsibility. The aircraft industry was unhappy with the relatively small orders of peace time, with government procurement policies, and with government competition. Wants, desires, hopes and fears echoed and re-echoed through the halls of Congress. Turbulence was truly a sign of the times, but it was also and more importantly, a manifestation of the growing pains of a lusty youngster.

1921

JANUARY

20—The Secretary of the Navy approved a recommendation that development of radio-controlled aircraft be undertaken by the Bureau of Ordnance and the Bureau of Engineering.

20—A Naval Aircraft Factory design of a turntable catapult, powered by compressed air, was approved by the Bureau of Construction and Repair for fabrication at the Philadelphia Navy Yard.

MARCH

7—CAPT. William A. Moffett relieved CAPT. T. T. Craven as Director of Naval Aviation.

15—The Metallurgical Laboratory at the Naval Aircraft Factory reported that a high-strength chromium-vanadium steel alloy had proven satisfactory both in extensive laboratory tests and in the actual manufacture of aircraft fittings. These findings marked an important advance in the development of metal as a high-strength aircraft structural material.

JUNE

16—Two CR-1 Curtiss racers were ordered, the first of the series with which Navy and Army fliers captured many world speed records.

JULY

12—An Act of Congress created a Bureau of Aeronautics, charged with matters pertaining to naval aeronautics as prescribed by the Secretary of the Navy.

21—THE BOMBING TESTS—The battleship *Ostfriesland* was sunk by heavy bombs dropped by Army bombers in the last of a series of tests to determine the effectiveness of air weapons against combatant ships and the means by which ship design and construction might counter their destructive capability. The tests, in which the Army participated at the invitation of the Navy, were carried out off the Virginia capes beginning 21 June. On that day, the German submarine *U-117* was sunk by 12 bombs dropped from Navy F5L's at 1,100 feet. On the 29th, Navy aircraft located the radio-controlled U.S. battleship ex-*Iowa* in 1 hour and 57 minutes, after being alerted of her approach somewhere within a 25,000 square mile area and attacked with dummy bombs. On 13 July, Army bombers sank the German destroyer *G-102*, and on the 18th the light cruiser *Frankfurt* went down under the combined effect of 74 bombs delivered by Army and Navy aircraft. Tests against the *Ostfriesland* began on 20 July when Army, Navy and Marine Corps planes dropped 52 bombs, and they ended the next day when the Army delivered eleven 1,000- and 2,000-pounders. Although the final sinking came before the full purpose of the tests was realized, it and other sinkings were conclusive evidence of the potency of air attack.

AUGUST

1—A World War I high-altitude bombsight, mounted on a gyroscopically stabilized base, was tested by the Torpedo Squadron, Atlantic Fleet at Yorktown, Va., marking the successful completion of the first phase of Carl L. Norden's development of an effective high-altitude bombsight for the Bureau of Ordnance.

9—RADM. B. A. Fiske, USN (Ret.), proposed as a landing surface for aircraft carriers, "a nice soft cushion" so mounted "that it would take up the forward motion of the airplane and not check its forward velocity at once."

10—A General Order established the Bureau of Aeronautics and defined its duties under the Secretary of the Navy as comprising "all that relates to designing, building, fitting out, and repairing Naval and Marine Corps aircraft"; gave it authority to recommend to the Bureau of Navigation and the Commandant of the Marine Corps on all matters pertaining to aeronautic training and the assignment of officer and enlisted personnel to aviation; described the scope of its relationships with other bureaus having cognizance of aeronautical materials and equipment; and also directed that special provision be made in its organization to furnish information "covering all aeronautic planning, operations, and administration that may be called for by the Chief of Naval Operations."

11—Practical development of carrier arresting gear was initiated at Hampton Roads as LT. A. M. Pride taxied an Aeromarine onto the dummy deck, and engaged arresting wires. These tests resulted in the development of arresting gear for the *Langley*, consisting essentially of both athwartship wires attached to weights, and fore and aft wires.

24—During its fourth trial flight, the R-38 (ZR-2), rigid airship built for the Navy by the Royal Air Force, broke into two parts and fell into the Humber River at Hull, England. It carried to their deaths 28 British nationals and 16 Americans, including Air Commodore E. M. Maitland and CDR. L. H.

which] lead around sheaves placed outboard to hydraulic brakes. The plane after engaging the transverse wire is guided down the deck by the fore and aft wires and is brought to rest by the action of the transverse wire working with the hydraulic brakes."

22—The Secretary of the Navy approved a recommendation of the General Board that one spotting plane be assigned to each Fleet battleship and cruiser, and that the feasibility of operating more aircraft from these ships be tested.

24—As part of a program to establish a higher standard of service acceptability of aircraft engines than the existing 50-hour requirement, a contract was issued to the Packard Motor Car Company for a 300-hour test of a Packard 1A–1551 dirigible engine.

25—The first all-metal airplane designed for the Navy made its first flight. The ST–1 twin-engine torpedo plane, built by Stout Engineering Laboratory, was test-flown by Eddie Stinson. Although this aircraft possessed inadequate longitudinal stability, its completion marked a step forward in the development of all-metal aircraft.

MAY

24—Routine operation of catapults aboard ship commenced with the successful launching of a VE–7 piloted by LT. Andrew C. McFall, with LT. D. C. Ramsey as passenger, from USS *Maryland*, off Yorktown, Va. The Mark A–1 compressed air catapult was used.

31—In the National Elimination Balloon Race at Milwaukee, the Navy was represented by two balloons, one manned by LCDR. J. P. Norfleet and Chief Rigger J. F. Shade, and the other by LT. W. F. Reed and Chief Rigger K. Mullenix. Norfleet's balloon was filled with helium, the first use of the gas in a free balloon. Reed finished third in the race with a distance of 441 miles and was the only Navy qualifier for the International Balloon Race to be held at Geneva, Switzerland, later in the year.

JUNE

17—The practice of numbering aircraft-squadrons to conform to the number of the ship squadron they served, was changed to a system of numbering all squadrons serially by class in the order in which they were initially authorized. The use of letter abbreviations to indicate mission was also adopted.

17—In anticipation of a reorganization that would merge the Atlantic and Pacific Fleets into a U.S. Fleet, the fleet aviation commands, whose titles had previously been changed from Air Forces to Air Squadrons, were retitled Aircraft Squadrons of the Scouting and Battle Fleets, which commands would replace the Atlantic and Pacific Fleets respectively.

26—The rigid airship USS *Los Angeles* (ZR–3) was ordered from the Zeppelin Airship Company, Friedrichshafen, Germany. This zeppelin, part of World War I reparations, was obtained as a nonmilitary aircraft under the terms approved by the Conference of Ambassadors on 16 December 1921.

JULY

1—Eight medical officers, the first to report for flight training, began their instruction at NAS Pensacola. Four had previously completed the flight surgeon's course at the Army Technical School of Aviation Medicine.

1—Congress authorized conversion of the unfinished battle cruisers *Lexington* and *Saratoga* to aircraft carriers.

1—Navy men began training in the care and packing of parachutes when 10 Chief Petty Officers reported for two months' instruction at the Army School at Chanute Field, Rantoul, Ill.

3—Class XVI, the first Class of Student Naval Aviators to be trained in landplanes, began training at Pensacola.

17—The Chief of Naval Operations forwarded a list of Bureau and Division representatives to the Bureau of Navigation with the request that they be ordered to meet as a board for the purpose of drawing up tactical doctrine governing the employment of spotting aircraft in fleet fire control.

SEPTEMBER

27—Torpedo and Bombing Plane Squadron, Atlantic Fleet, flying PT–1's and PT–2's in a practice torpedo attack, scored seven hits on the battleship *Arkansas*, which was maneuvering at full speed 70 miles off the Virginia Capes.

OCTOBER

8—The Curtiss Marine Trophy Race for seaplanes, held at Detroit as an event of the National Air Races, was won by LT. A. W. Gorton, flying a TR–1 powered by a Lawrance J–1 engine. He averaged 112.6 m.p.h. over the 160-mile course. Second place went to LT. H. A. Elliott in a Vought VE–7H

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demonstrated in an F5L, and was found satisfactory up to a range of 10 miles. It also stated that radio control of an airplane during landing and takeoff was feasible.

17—LT. Rutledge Irvine, flying a Douglas DT equipped with a Liberty engine, established a world altitude record for Class C airplanes with a useful load of 1,000 kilograms, reaching 11,609 feet over McCook Field, Dayton, Ohio.

MAY

26—The Chief of the Bureau of Aeronautics agreed with the Chief of the Air Service that it would be advantageous to both the aviation industry and the military services to work under identical aeronautic specifications whenever possible and further stated that he considered it desirable for the Army and Navy to work together toward that end immediately. When LT. R. S. Barnaby was ordered to McCook Field as the Bureau's representative at an interservice conference on standardization in December, a series of annual meetings was initiated that continued until 1937, when the Aeronautical Board assigned a full-time staff to carry on the work.

JUNE

6—Planes and pilots of Aircraft Squadrons, Battle Fleet, established seven world records for Class C seaplanes at San Diego, Calif., as follows:

LT. (jg) M. A. Schur, in a DT-2 torpedo plane, set the speed record for 500 kilometers at 72 m.p.h.

LT. H. T. Stanley, in an F5L patrol plane, set distance and duration records with a payload of 250 kilograms at 574.75 miles and 10 hours, 23 minutes, 58 seconds.

LT. H. E. Halland, in an F5L patrol plane, set distance and duration records with a 500-kilogram payload at 466 miles and 7 hours, 35 minutes, 54 seconds.

LT. R. L. Fuller, in a DT-2 torpedo plane, set distance and duration marks with a 1,000-kilogram payload at 205.2 miles and 2 hours, 45 minutes, 9 seconds.

7—Pilots at San Diego continued their assault on the record books with eight new world marks for Class C seaplanes as follows:

LT. E. B. Brix, in a DT-2, set an altitude record of 10,850 feet for planes carrying a 250-kilogram useful load.

LT. R. L. Fuller, in an F5L, set an altitude record of 8,438 feet for planes carrying a 500-kilogram load.

ENS. E. E. Dolecek, in an F5L, set an altitude record of 7,979 feet for planes with a 1,000-kilogram load.

LT. C. F. Harper, in a DT-2, set the altitude record of 13,898 feet for planes with no useful load.

LT. H. T. Stanley, in an F5L with a 1,500-kilogram load set the duration mark at 2 hours, 18 minutes, and an altitude record of 5,682 feet.

LT. H. E. Halland, in an F5L with a 2,000-kilogram load, set a duration record of 51 minutes and an altitude record of 4,885 feet.

12—LT. (jg) M. A. Schur, flying a DT-2 Douglas torpedo plane powered with a Liberty engine, set three world records at San Diego for Class C seaplanes with a duration mark of 11 hours, 16 minutes, 59 seconds, a distance mark of 792.25 miles, and a speed of 70.49 m.p.h. for 1,000 kilometers.

13—At San Diego, LT. R. A. Ofstie, in a TS seaplane equipped with a Lawrance J-1 engine, set world speed records for Class C seaplanes for 100 and 200 kilometers with speeds of 121.95 and 121.14 m.p.h. respectively.

JULY

21—The Bureau of Aeronautics established a policy of assigning experimental airplanes to fleet squadrons for operational evaluation before adopting them as service types.

AUGUST

13—Constructive action towards building an effective aviation branch of the Naval Reserve Force was marked by the commissioning of Naval Aviation Reserve Units at Fort Hamilton, N.Y., and Squantum, Mass.

SEPTEMBER

4—The USS *Shenandoah* (ZR-1) made its first flight at Naval Air Station, Lakehurst, CAPT. F. R. McCrary commanding.

28—U.S. Navy aircraft won first and second places in the international seaplane race for the Schneider Cup at Cowes, England, and in winning established a new world record for seaplanes with a speed of 169.89 miles per hour for 200 kilometers. LT. David Rittenhouse, the new record holder, marked up 177.38 miles per hour for the race and LT. Rutledge Irvine placed second with 173.46 m.p.h. Both were flying CR-3's equipped with Curtiss D-12 engines.

Bay, remained moored to the ship during her passage to anchor off Jamestown, R.I., and cast off next day, almost 24 hours later. This was the first use of the mooring mast erected on shipboard to facilitate airship operations with the fleet.

11—Observation planes from the light cruiser *Raleigh* took off from the water near the Arctic Circle on the first of several reconnaissance flights over the Greenland coast from Angmagsalik to Cape Farewell to locate suitable emergency landing areas for the Army flyers, then crossing the Atlantic, via Iceland, on the last leg of their round-the-world flight.

15—In the first use of rigid airships with the fleet, the USS *Shenandoah* departed Lakehurst to take part in a Scouting Fleet problem 300 miles at sea. She discovered the "enemy" fleet but heavy rains forced her early retirement to base where she arrived 17 August after 40 hours in the air.

SEPTEMBER

1—A parachute school opened at NAS Lakehurst to train enlisted men in the care, operation, maintenance, and testing of parachutes—the first school of its kind in the Navy.

15—An N-9 seaplane, equipped with radio control and without a human pilot aboard, was flown on a 40-minute flight at the Naval Proving Grounds, Dahlgren. Although the aircraft sank from damage sustained while landing, this test demonstrated the practicability of radio control of aircraft.

18—The repair ship *Medusa* (AR-1) was commissioned and a section of Observation Squadron VO-2, consisting of 2 officers and 20 men, was organized and assigned as a ship-plane repair detail to support the operations of VO Squadron 1.

OCTOBER

10—A CS-2 seaplane, piloted by LTs. Andrew Crinkley and Ross G. Lyons, landed at Quantico, Va., after a continuous flight from NAS Anacostia of 20 hours, 28 minutes, and 1,460 miles logged. Although the flight exceeded world records for endurance and distance, it was not officially timed and therefore not an official record.

15—The rigid airship ZR-3 was delivered at NAS Lakehurst, completing a 5,000-mile flight from Friedrichshafen, Germany, in 81 hours under the command of Dr. Hugo Eckener, and with prospective commanding officer, CAPT. G. W. Steele aboard.

16—EMERGENCY USE OF PARACHUTE—Following a mid-air collision over Coronado, California, Gunner W. M. Coles, USN, of VF Squadron 1, made a successful emergency parachute jump from his JN.

25—When all foreign entrants withdrew from the Schneider Cup Race to be held at Bayshore Park, Md., the United States agreed to cancel the race rather than win by a flyaway. Instead, the Navy staged a series of record attempts in which the scheduled contestants and other naval aircraft put 17 world's records in the book for Class C seaplanes as follows:

LT. G. T. Cuddihy, in a CR-3 powered with a Curtiss D-12 engine, broke a maximum world speed record of almost 2 years' standing with 188.078 m.p.h.

LT. R. A. Ofstie, in a CR-3 with a Curtiss D-12 engine, broke world speed records for 100, 200, and 500 kilometers with marks of 178.25 m.p.h. for the 100 and 200, and 161.14 for the 500.

LT. G. R. Henderson, in a PN-7 flying boat equipped with two Wright T-2 engines, set four records for speed over 100 and 200 kilometers with loads of 250 and 500 kilograms, all at 78.507 m.p.h.; and four records with a useful load of 1,000 kilograms with a speed of 78.507 m.p.h. for 100 and 200 kilometers, a distance record of 248.55 miles and a duration record of 5 hours, 28 minutes, 43 seconds.

LT. O. B. Hardison, also in a PN-7, set world records for speed over 100 kilometers, and for distance with a useful load of 1,500 kilograms at 68.4 m.p.h. and 62.137 miles, and three more with a useful load of 2,000 kilograms in speed for 100 kilometers of 68.4 m.p.h., distance 62.137 miles, and duration 1 hour, 49 minutes, 11.9 seconds.

25—The rigid airship USS *Shenandoah*, commanded by LCDR. Z. Lansdowne, landed at NAS Lakehurst completing a round-trip transcontinental cruise that began on 7 October and covered 9,317 miles in 258 hours of flight. The trip included stops at Fort Worth, San Diego, and a stay of 11 days on the west coast, including a flight to Camp Lewis at Tacoma, Wash.

NOVEMBER

11—LT. Dixie Kiefer piloted a plane in a successful night catapult launch from the USS *California* at anchor in San Diego harbor. The launch at 2146 was aided only by searchlights trained about 1,000 yards ahead.

8—LT. John D. Price, piloting a plane of VF–1, made a night landing on the USS *Langley*, at sea off San Diego and was followed on board by LTs. D. L. Conley, A. W. Gorton and R. D. Lyon. Except for an accidental landing on the night of 5 February when LT. H. J. Brow stalled while practicing night approaches, these were the first night landings made on board a U.S. carrier.

8—Almost two years after the special aviation uniform had been abolished, new uniforms of forestry-green for winter and khaki for summer were authorized for Naval Aviators, Observers, and other officers on duty involving flying. Although there were minor modifications to the original design in later years, this uniform, in khaki, was adopted for the entire Navy in 1941.

MAY

1–2—LTs. C. H. Schildhauer and J. R. Kyle, on a test flight over Philadelphia of the PN–9, manufactured at the Naval Aircraft Factory, broke the world endurance record for Class C seaplanes, remaining in the air for 28 hours, 35 minutes, 27 seconds. The plane, a metal-hulled flying boat equipped with two Packard engines, was used by Rodgers later in the year on his record flight toward Hawaii.

5—The Secretary of the Navy approved reorganization of certain departments at the Naval Academy as required to make aviation an integral part of the curriculum; the establishment of a program, beginning with the Class of 1926, to give three months of special ground and flight instruction to all midshipmen; and additional instruction as necessary to qualify each graduate as an aviator or observer during the first two years after graduation.

JUNE

17—The Naval Air Detail, under LCDR. R. E. Byrd of the MacMillan Expedition, sailed from Boston with three Loening amphibians aboard the SS *Peary*. The SS *Bowdoin* joined the *Peary* off Wiscasset, Maine, and after a 3,000-mile voyage, the expedition reached Etah in North Greenland on 1 August to begin an aerial exploration of the area that covered 30,000 square miles before the end of the month.

JULY

1—When a law, enacted 28 February, became effective, the Naval Aviation Reserve began to organize into 10 squadrons of 4 divisions each. Authorized squadron complements for each of 3 scouting and 3 bombing squadrons were established at 40 officers and 130 men, and for each of 4 fighting squadrons at 18 officers and 20 men.

SEPTEMBER

1—CDR. John Rodgers, LT. B. J. Connell and crew of three in a PN–9, attempting a flight from San Francisco to Honolulu, were forced down by lack of fuel shortly after four in the afternoon. Lost at sea for 10 days in spite of extensive air and sea search, Commander Rodgers and his crew rigged sail from the wing fabric and set course for Kaui Island. After covering about 450 miles by sail, they were sighted on 10 September by the submarine *R–4*, 10 miles from their goal. The 1,841.12 statute miles, flown from 31 August to their forced landing was accepted by the F.A.I. as a new world airline distance record for Class C seaplanes that remained unbeaten for almost five years.

3—The rigid dirigible *Shenandoah* was torn apart in a severe line squall before daylight over Byesville, Ohio. The control car and after section of the hull fell directly to the ground, while the forward section with seven men aboard free-ballooned for an hour to land all hands safely 12 miles from the scene of the crash. In all there were 29 survivors, but 14 were killed including LCDR. Zachary Lansdowne, the Commanding Officer.

29—The Chief of Naval Operations directed that all heavier-than-air Naval Aviators, not already qualified to pilot landplanes, be given training in landplane operation.

OCTOBER

5—VJ–1B, first of the Utility Squadrons, was formed at San Diego from personnel of VS–2B and assigned to Aircraft Squadrons, Battle Fleet. LT. J. F. Moloney was the first commanding officer.

26—The two Navy entries in the Schneider Cup Race at Bay Shore Park, Md., flown by LTs. George Cuddihy and Ralph A. Ofstie, were forced out of the race on the last lap with engine trouble.

27—Oleo shock-absorbing landing gear for aircraft was reported in use on NB–1, FB–1, UO–1, SC–2 and new bombing planes being constructed by the Naval Aircraft Factory, Douglas and Boeing.

NOVEMBER

30—The President's Aircraft Board, better known for its senior member as the Morrow Board, submitted its report to President Coolidge. On the basis of

10—Edward P. Warner took the oath of office as the first Assistant Secretary of the Navy for Aeronautics.

28—The submarine *S-1*, commanded by LT. C. B. Momsen, surfaced and launched a Cox-Klemin XS-2 seaplane, flown by LT. D. C. Allen. It later recovered the aircraft and submerged, thereby carrying out the first complete cycle in a series of experimental operations of basing airplanes aboard submarines.

AUGUST

9—In a day of tests to determine the speed with which aircraft could be operated at sea, pilots of VF Squadron 1 completed 127 landings aboard USS *Langley*. As a result of the experience gained, the same squadron later landed 12 planes in 21 minutes under the emergency conditions created when the ship ran into a heavy mist.

27—CDR. John Rodgers, Naval Aviator No. 2, on a flight from Anacostia, crashed in the Delaware River near the Naval Aircraft Factory dock and received injuries from which he died on the same day.

OCTOBER

22—In a display of tactics developed by VF Squadron 2, LCDR. F. D. Wagner led the F6C-2 Curtiss fighters in a simulated attack on the heavy ships of the Pacific Fleet as they sortied from San Pedro. Coming down in almost vertical dives from 12,000 feet at the exact time of which the fleet had been forewarned, the squadron achieved complete surprise and so impressed fleet and ship commanders with the effectiveness of their spectacular approach that there was unanimous agreement that such an attack would succeed over any defense. This was the first fleet demonstration of dive-bombing and although the tactic had been worked out by the demonstrating squadron in an independently initiated project, the obvious nature of the solution to the problem of effective bomb delivery was evident in that the same tactic was similarly and simultaneously being developed by VF Squadron 5 on the east coast.

NOVEMBER

13—LT. C. F. Schilt, USMC, flying an R3C-2, took second in the Schneider Cup Race at Hampton Roads, Va., with an average speed of 231.363 m.p.h. This was the last Navy participation in international racing competition.

1927

JANUARY

1—A flight test section was established as a separate department at Naval Air Station, Anacostia, with LT. G. R. Henderson in charge.

1—To test the feasibility of using enlisted pilots in fleet squadrons, VF Squadron 2B, manned with 4 Naval Aviators and 10 Aviation Pilots, was put into commission at San Diego, LCDR. J. M. Shoemaker commanding.

18—LCDR. J. R. Poppen, MC, reported for duty in charge of the Aviation Section of the Naval Medical School, Washington, D.C., marking the beginning of a three-month period during which the entire resources of the school were devoted to intensive instruction in aviation medicine. The institution of this program also marked the beginning of Flight Surgeon training in the Navy and the discontinuance of an interservice agreement in effect since 1922, by which Navy Medical Officers were trained in this specialty at the Army School for Flight Surgeons.

MARCH

9—The first passenger transport, the JR-1 trimotor, was purchased from the Ford Motor Company following a demonstration at Naval Air Station, Anacostia.

APRIL

14—LT. G. R. Henderson, flying a Vought O2U *Corsair* equipped with a Pratt & Whitney *Wasp* engine, broke the world altitude record for Class C seaplanes with a useful load of 500 kilograms, reaching 22,178 feet over Washington, D.C.

23—LT. S. W. Callaway, flying a Vought O2U *Corsair* at Hampton Roads, Va., set a new 100-kilometer world speed record for Class C seaplanes with a 500 kilogram useful load, at 147.263 m.p.h.

30—LT. J. D. Barner, flying a Vought O2U *Corsair* at Hampton Roads, Va., broke the 500-kilometer world speed record for Class C seaplanes carrying a useful load of 500 kilograms with a speed of 136.023 m.p.h.

MAY

5—LT. C. C. Champion took off from Hampton Roads, Va., in a Wright *Apache*, equipped with a Pratt & Whitney *Wasp* engine and NACA supercharger, and climbed to an altitude of 33,455 feet, breaking the existing world record for Class C seaplanes by better than 3,000 feet.

11—The first takeoff and landing aboard the USS *Saratoga*, (CV-3), was made by her Air Officer, CDR. Marc A. Mitscher in a UO-1.

27—The *Los Angeles* (ZR-3) made a successful landing on the USS *Saratoga* at sea off Newport, R.I., and remained on board for about an hour while transferring passengers and taking on fuel, water, and supplies.

FEBRUARY

27—CDR. T. G. Ellyson, the first Naval Aviator, and LCDR. Hugh Schmidt and LT. Roger Ramscheusen, crashed to their deaths in a Loening amphibian in Chesapeake Bay while on a night flight from Norfolk to Annapolis.

28—The contract for the XPY-1 flying boat was issued to the Consolidated Aircraft Corporation. This aircraft, which was designed for alternate installation of two or three engines, was the first large monoplane flying boat procured by the Navy, and was the initial configuration which evolved into the PBY *Catalina*.

MAY

3-5—LTs. Arthur Gavin and Zeus Soucek, in a PN-12 equipped with two Wright *Cyclone* engines, set the world duration record for Class C seaplanes in a flight of 36 hours 1 minute over Philadelphia.

11—An Act of Congress provided that duty performed by officers assigned to airships which required them to make regular and frequent aerial flights, could be certified by the Secretary as service equivalent to sea duty.

19—MAJ. Charles A. Lutz, USMC, won the Curtiss Marine Trophy Race at Anacostia in an F6C-3, making a speed of 157.6 m.p.h. over the 100-mile course.

25-26—LTs. Zeus Soucek and Lisle Maxson, in a PN-12 powered by two Wright engines, set world marks for Class C seaplanes with a 1,000-kilogram useful load: speed over 2,000 kilometers at 80.288 m.p.h; distance at 1,243.20 miles; and duration at 17 hours 55 minutes 13.6 seconds.

JUNE

12—The USS *Lexington* (CV-2) anchored in Lahaina Roads at the end of a speed run from San Pedro to Honolulu that broke all existing records for the distance with an elapsed time of 72 hours and 34 minutes.

26—LT. Arthur Gavin, piloting a PN-12 powered with two Pratt & Whitney *Hornet* engines, set a world altitude record of 15,426 feet at Philadelphia for Class C seaplanes with a payload of 2,000 kilograms.

27—LT. Arthur Gavin, in a PN-12 equipped with two 525-hp. Pratt & Whitney engines, made a world record altitude flight of 19,593 feet at Philadelphia for Class C seaplanes with a useful load of 1,000 kilograms.

30—A contract was issued to the Martin Company for development of the XT5M-1 "diving bomber," which, in a later production version, became the BM-1. This aircraft and the Naval Aircraft Factory's similar XT2N-1 were the first dive bombers designed to deliver a 1,000-pound bomb.

JULY

11-12—A PN-12, powered with two Pratt & Whitney engines and piloted by LT. A. W. Gorton and Chief Boatswain E. E. Reber, in a flight out of Philadelphia, set five world records for Class C seaplanes as follows: distance and speed for 2,000 kilometers with both 1,000- and 2,000-kilogram loads at 1,336 miles and 81.043 m.p.h.; and a duration mark of 16 hours, 39 minutes with a 2,000-kilogram load.

25—The removal of bow and stern catapults on the *Langley* was authorized since neither had been operated in three years.

OCTOBER

6—Contracts for the 6,500,000-cubic-foot rigid airships ZRS-4 and ZRS-5, subsequently christened USS *Akron* and USS *Macon*, were let to the Goodyear Zeppelin Corporation, Akron, Ohio.

6—A contract was issued for metal-clad airship, the ZMC-2, to the Aircraft Development Corporation, Detroit. Its principal experimental feature, a skin of thin aluminum sheeting rather than fabric, gave rise to the term "metal-clad."

DECEMBER

14—Fourteen fighting-plane radio telephone sets, operating on a frequency of 3,000 to 4,000 kilocycles and featuring an engine-driven generator, were shipped to VB-2B Squadron aboard the *Saratoga* for service tests. This equipment had been designed at NAS Anacostia and manufactured at the Washington Navy Yard in order to provide early evaluation of radio equipment in single-seat aircraft.

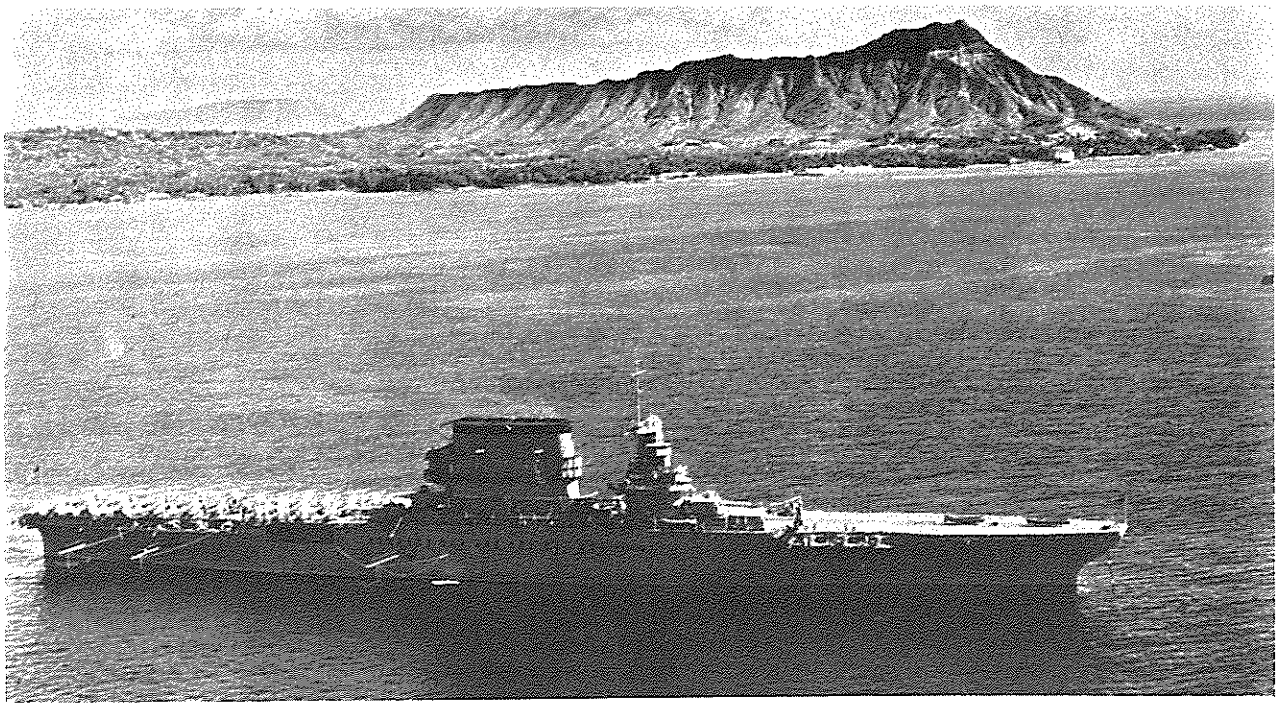
JUNE

4—LT. Apollo Soucek, in a Wright *Apache* equipped with a Pratt & Whitney *Wasp* engine, set the new world altitude mark for Class C seaplanes at 38,560 feet.

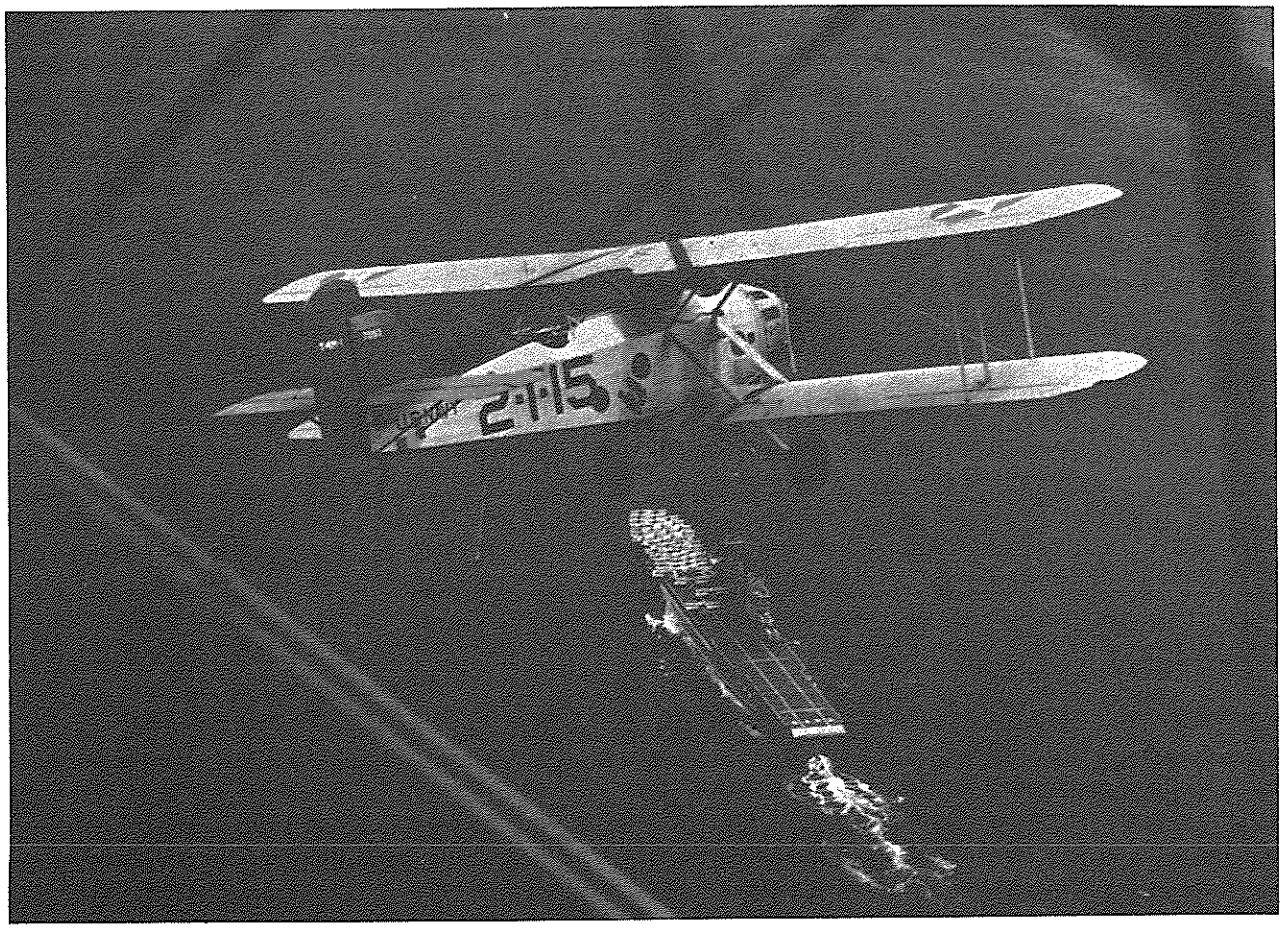
AUGUST

19—The ZMC-2, a metal clad 200,000-cubic foot airship built by Aircraft Development Corporation, made its first flight at Grosse Ile (Detroit) Airport. This airship, subsequently delivered to NAS Lakehurst, was utilized several years for training purposes.

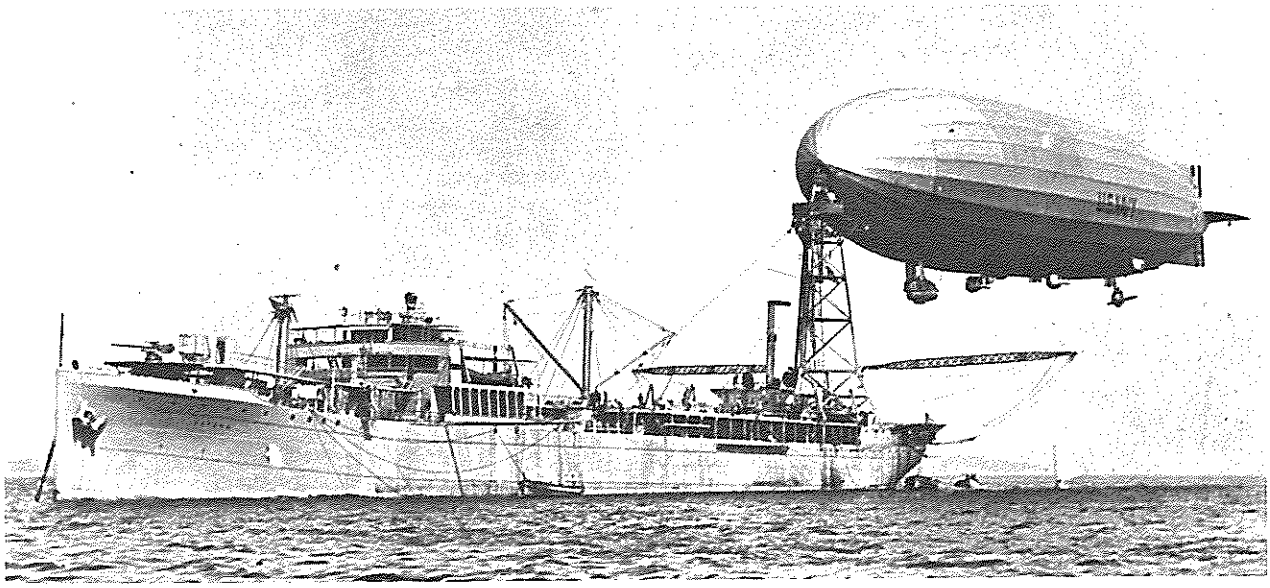
20—A UO-1 airplane, piloted by LT. A. W. Gorton, made a successful hook-on landing aboard the USS *Los Angeles* over NAS Lakehurst.



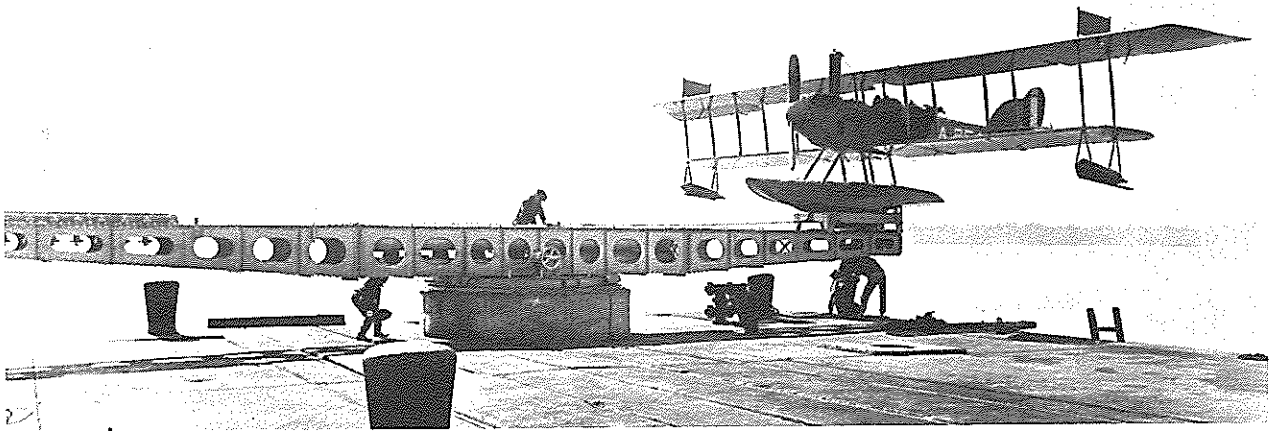
USS LEXINGTON OFF DIAMOND HEAD. LEXINGTON AND SARATOGA, CV–2 AND –3, WERE CONSTRUCTED ON BATTLE CRUISER HULLS



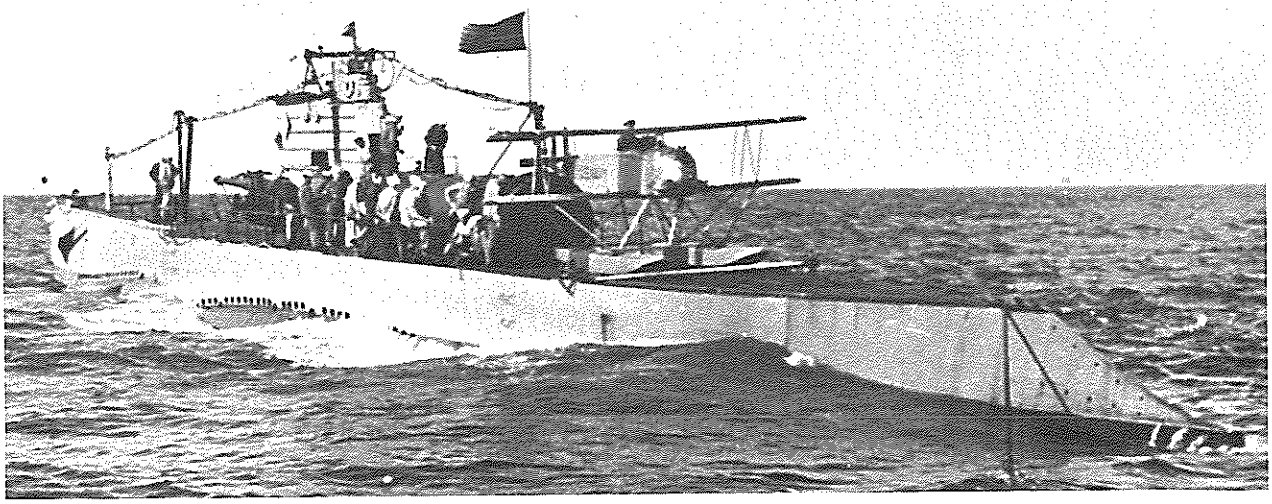
FLYING ABOVE THE SARATOGA, A T4M–1, WITH TAIL HOOK EXTENDED, AWAITS ITS TURN TO LAND ON THE MOBILE AIRFIELD



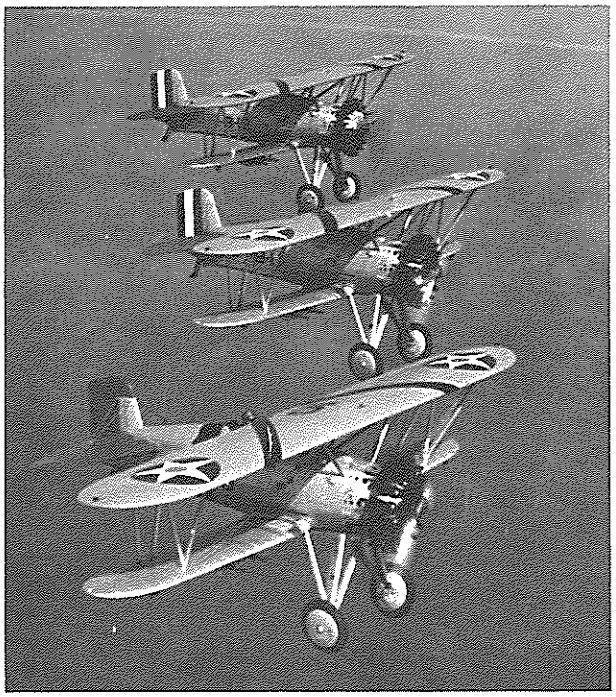
IN FIRST USE OF MOORING MAST ABOARD SHIP, THE RIGID AIRSHIP USS SHENANDOAH MOORED TO USS PATOKA, AUGUST 8, 1924



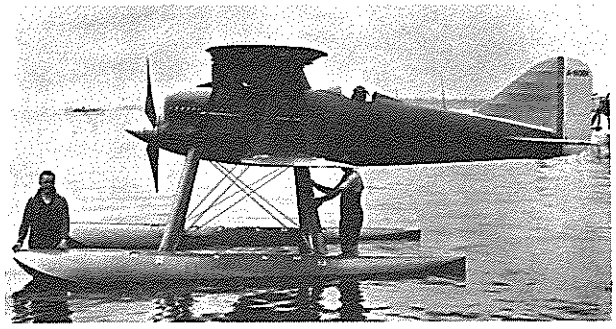
AIRCRAFT WERE LAUNCHED FROM CAPITAL SHIPS BY MEANS OF TURNTABLE CATAPULT, SHOWN ON A PIER AT NAF WITH AN N–9



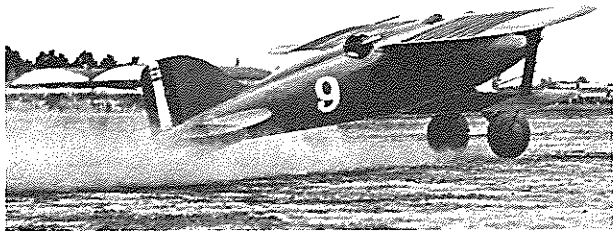
THE S–1 DEMONSTRATES THE FEASIBILITY OF OPERATING AIRCRAFT FROM SUBMARINES IN TESTS WITH THE XS–2 SEAPLANE, 1926



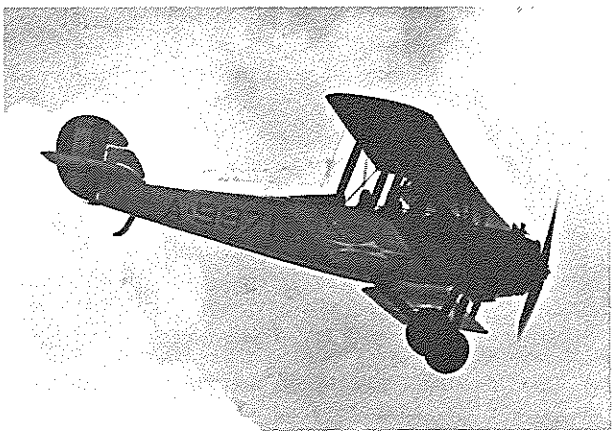
F4B'S OF FIGHTER SQUADRON VF–1B FLYING IN FORMATION



CURTISS CR–3, WINNER OF 1923 SCHNEIDER TROPHY RACE



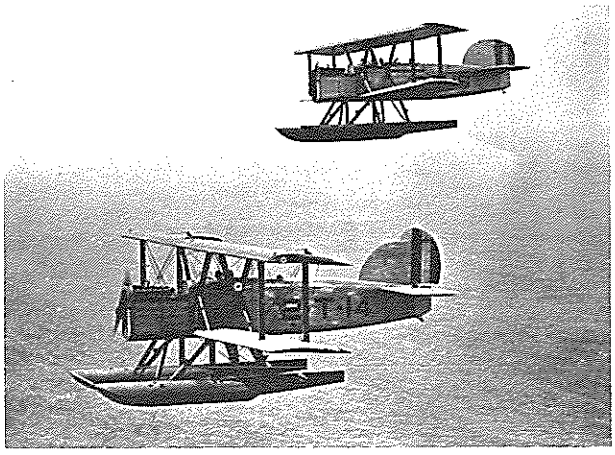
AL WILLIAMS' R2C, WINNER OF THE 1923 PULITZER RACE



VOUGHT VE–7, TYPE TO MAKE THE FIRST LANGLEY TAKE-OFF

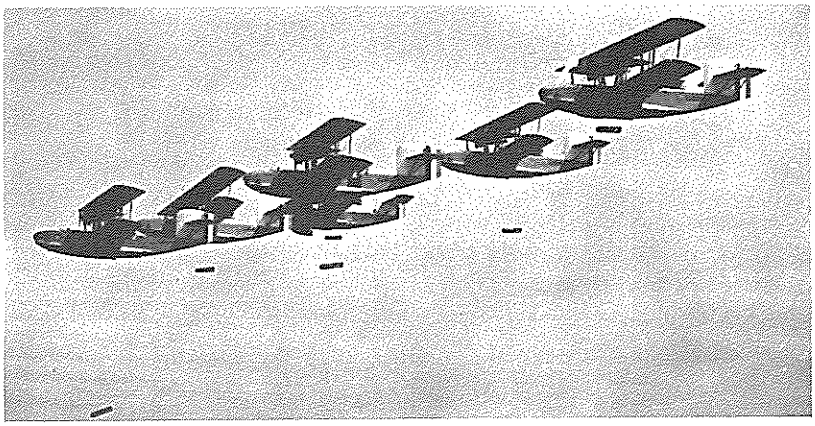
LT H. J. BROW AND HIS 1922 CURTISS CR PULITZER RACER

THE F6C–1 CURTISS FIGHTER POWERED WITH D–12 ENGINE

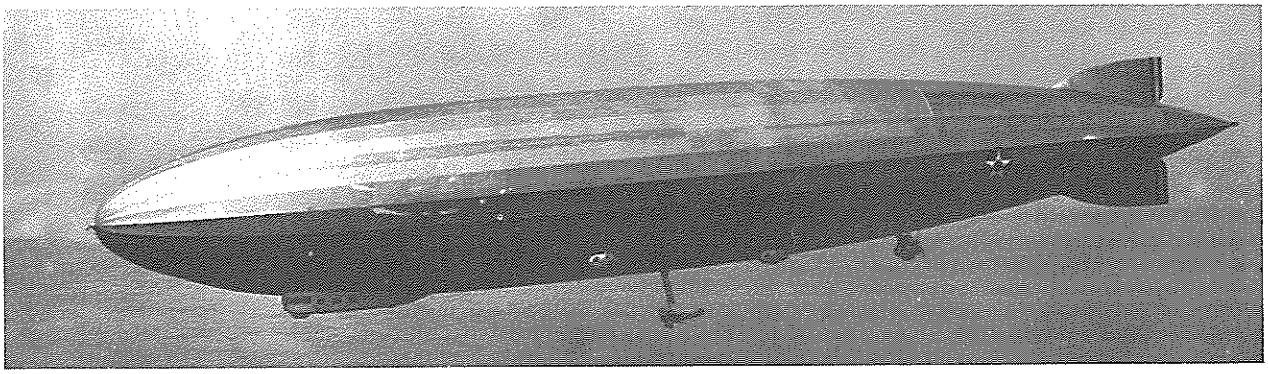


TWO VERSIONS OF DOUGLAS 1921–1922 DT TORPEDO PLANE

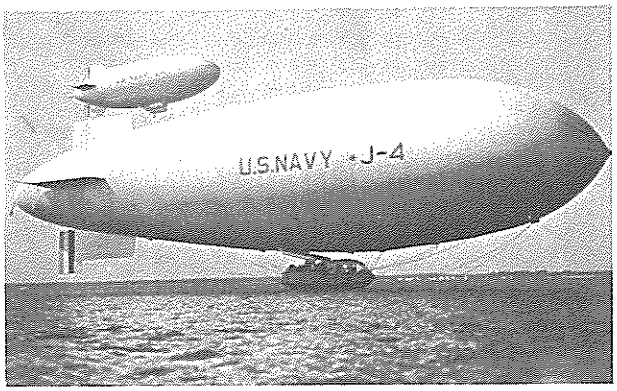
A MARTIN BOMBER DROPPING A TORPEDO



PD–1 PATROL PLANES CONDUCTING HIGH ALTITUDE HORIZONTAL BOMBING EXERCISE

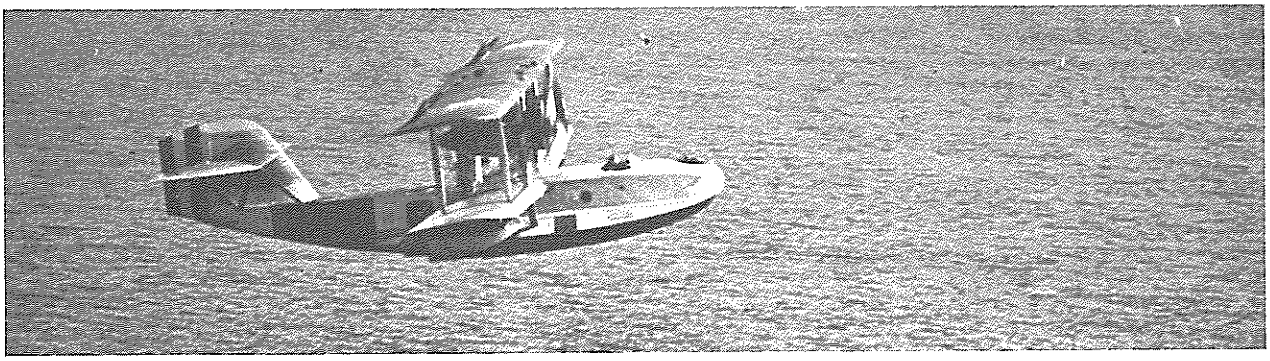


LT A. W. GORTON FLYING A VOUGHT UO–1 MAKES A HOOK-ON LANDING ON THE USS LOS ANGELES, GERMAN BUILT RIGID AIRSHIP



THE NON-RIGID AIRSHIPS J–4 AND L–1 OVER BARNEGAT BAY

ZMC–2 METAL-CLAD AIRSHIP COMPLETED IN AUGUST 1929



RODGER'S PN–9 ON MAINLAND TO HAWAII FLIGHT. FORCED DOWN AFTER RECORD DISTANCE, PLANE SAILED 450 MILES TO KAUI

PART IV
THE THIRTIES
1930–39

The Thirties began quietly with an international treaty extending previous agreements to reduce naval armament, but as the years passed the quiet was dissipated as the nations of the world moved inexorably toward war.

In the United States, the period began with disturbing indications of a dark economic depression that soon became harsh reality. Forced by this circumstance to effect rigid economies, the expansion of naval aviation was slowed, the aircraft inventory was barely sufficient to equip operating units, research and development programs suffered, and operations were drastically curtailed. But as the nation began its program to recover prosperity through the initiation of public works, money was made available for more naval aircraft, for new ships, and for modernizing naval air stations. The upward swing began.

In spite of the hardships, there were surprising gains in aviation technology. Engineers and aircraft manufacturers produced more dependable products, aircraft equipment and components were refined and improved, and aircraft performance rose sharply. Better radios of reduced size, more accurate bombsights, supercharged power plants, controllable-pitch propellers, efficient retractable landing gear and folding wings, all contributed to the improvement of aircraft performance and made airplanes better instruments of war. Hydraulic arresting gear and catapults were installed aboard aircraft carriers. Better methods of recovering battleship and cruiser observation planes were developed. The feasibility of instrument flight was demonstrated ashore and at sea. Radio controlled planes of dependable performance were put to practical use as targets for AA gunners. Engineers and designers learned more about the value of streamlining and clean designs.

In operations, there was a change as whole squadrons began to turn in the record performances previously accomplished by individual pilots. Tactical innovations of the Twenties became fleet doctrine. Three new aircraft carriers joined the fleet, raising the operational total high enough to equip peace-time forces with a respectable sea-going air arm. Naval aviation acquired broader respect and, as it achieved prominence in both fleet organization and operations, became a truly integrated arm of naval power.

Only in the field of lighter-than-air was there a serious setback. Crashes of the *Akron* and the *Macon* sounded the death knell of the Navy's rigid airship program and in spite of favorable reports from investigating committees, continued successes in Germany, and repeated recommendations as to their value in specialized operations, the rigid airship was finished. By association, non-rigids almost followed them into oblivion.

As the decade drew to its close, the ominous rumblings of limited wars that had echoed across both oceans throughout the period, grew louder. Naval expansion was authorized; the pilot training program was stepped up. Ships that would make history in World War II were designed and laid down. Aircraft, that would operate from their decks in the bold advance across the Pacific, were on the drawing boards and some were getting their feel of the air. As the rumblings burst forth into the full force of a European war and the United States declared its neutrality, the Navy, strongly bolstered by aviation, patrolled the Atlantic seaboard in operations that were strangely similar to those which the same units would later perform under conditions of war.

NOVEMBER

28—The Chief of Naval Operations, ADM. W. V. Pratt, issued a new naval air policy, effective 1 April 1931, which essentially reorganized aviation and established it as an integral part of the Fleet to operate with it under the direct command of the Commander in Chief, U.S. Fleet. The policy stressed the importance of fleet mobility and the need for offensive action in protecting against invasion from overseas, assigned the development of the offensive power of the fleet and advanced base forces as the primary task of naval aviation, and relegated participation in coast defense to the status of a secondary task. To complete the change, the policy also directed that air stations in strategic naval operating areas henceforth be assigned to, and operate under the Fleet, and only such other stations as necessary for training, test, aircraft repairs, and similar support functions would be maintained under shore command.

DECEMBER

2—The seaplane tender *Aroostook*, and one utility and two patrol squadrons of the Battle Fleet reported for duty to Commander Base Force, thereby providing that command with its first aviation organization.

1931

JANUARY

8—Further development of dive-bombing equipment and tactics was insured as tests completed at the Naval Proving Grounds, Dahlgren, showed that displacing gear eliminated the recently encountered danger of a bomb colliding with its releasing airplane.

9—An agreement was announced between the Chief of Naval Operations, ADM. William V. Pratt, and the Army Chief of Staff, GEN. Douglas MacArthur, governing the operations of their respective air forces, which climaxed a long standing interservice controversy over the division of responsibilities for coast defense. Under the terms, the functions of the two air forces were closely associated with those of their parent services; the naval air force was defined as an element of the Fleet to move with it and to carry out its primary mission; and the Army air force as a land-based air arm to be employed as an essential arm of the Army in performing its general mission, including defense of the coast at home and at possessions overseas.

22—The Navy ordered its first rotary winged aircraft, the XOP-1 autogiro, from Pitcairn Aircraft, Incorporated.

FEBRUARY

25—A new pilot training syllabus was issued which added a course in Advanced Seaplane Training and returned the courses in Bombing and Torpedo, and Observation and Gunnery, dropped in November 1929, thereby expanding the regular flight course to 258.75 hours and, for those also taking Advanced Combat, to 282.75 hours. The ground school course was also expanded in some areas and with the inclusion of a short course in photography, totalled 386.5 hours.

MARCH

2—A propeller development program, which led to the adoption of variable pitch propellers, was initiated with the award of a contract to Hamilton Standard Propeller Company for two such propellers suitable for use on fighting planes.

3—A recommendation that two officers from the postgraduate aeronautical engineering group be selected for study at the California Institute of Technology was approved. As a result, the policy of assigning postgraduate students to civilian institutions was broadened to permit greater specialization, and for the next three school years students were assigned in two groups; one to MIT where emphasis was on aircraft engines; the other to CalTech for study of aircraft structures.

31—When a disastrous earthquake shook Nicaragua and destroyed most of the city of Managua, the USS *Lexington* was ordered from Guantanamo to assist other Navy and Marine units in relief operations. Early the next afternoon, she inaugurated carrier aircraft relief operations in the U.S. Navy, by launching five planes carrying medical personnel, supplies, and provisions to the stricken city.

APRIL

1—A reorganization of the U.S. Fleet into Battle, Scouting, Submarine, and Base Forces, provided for the appointment of type commanders for each type of ship and for aircraft, and designated the aviation type commands in the Battle, Scouting and Base Forces as Commander Aircraft (name of Force).

2—A contract for the XFF-1 two-seat fighter, the first naval aircraft to incorporate retractable landing gear for the purpose of improving aerodynamic cleanness and thereby increasing performance, was issued to Grumman.

JUNE

1—The resignation of the Assistant Secretary of the Navy for Aeronautics, David S. Ingalls, was accepted by the President and it was announced that as an economy measure the appointment of a successor was not contemplated. The office remained vacant until 1941.

30—The USS *Los Angeles* (ZR–3) was decommissioned for economy reasons at Naval Air Station, Lakehurst, after eight years of service and over 5,000 hours in the air.

JULY

1—The requirement of an earlier law that 30 percent of the Navy's pilots be enlisted men, was reduced to 20 percent as an amending Act became effective. The restrictive nature of the requirement was modified by an additional provision that it was applicable except when, in the opinion of the Secretary of the Navy, it was impracticable to obtain the required number of enlisted pilots.

28—Research into the physiological effects of high acceleration and deceleration, encountered in dive bombing and other violent maneuvers, was initiated through a Bureau of Aeronautics allocation of funds to the Bureau of Medicine and Surgery for this purpose. The pioneer research, pointing to the need for anti-g or anti-blackout equipment, was performed at Harvard University School of Public Health by LCDR. John R. Poppen MC, under the direction of Dr. C. K. Drinker.

SEPTEMBER

25–27—The International Balloon Race, held at Basle, Switzerland, was won by LT. T. G. W. Settle and LT. W. Bushnell in a flight which ended on the Polish-Latvian border near Vilna and established a new world distance record of 963.123 miles for balloons in three categories of volume.

NOVEMBER

10—A contract for 125 sets of GF radios was issued to the Aviation Radio Corporation. This was the first production order for radio equipment suitable for installation in single-seat fighters.

22—Following tests of the OP–1 autogiro in Nicaragua, MAJ. Francis P. Mulcahy, USMC, reported that the autogiro's chief value in expeditionary duty was in inspecting small fields recommended by ground troops as landing areas, evacuating medical "sitting" cases, and ferrying of important personnel.

1933

JANUARY

4—A new plan for postgraduate work was approved which combined the existing programs for specialists and for the General Line, and extended the aeronautical engineering program to three years. Under the new plan, all officers selected for postgraduate work began with one year in the School of the Line. Those demonstrating ability and interest in advanced technical specialties were given a second year in that area of study and, in the third year, were sent to a civilian institution for work, in most instances leading to a Master of Science degree.

25—The Bureau of Navigation announced that the assignment of naval officers to flight training at Pensacola would be resumed in May or June, or almost a year since the last group had been assigned.

FEBRUARY

16—The President presented to COL. Nathan D. Ely, USA(Ret), the Distinguished Flying Cross, awarded posthumously to his son, Eugene B. Ely, for extraordinary achievement as a pioneer aviator and for significant contribution as a civilian to the development of aviation in the Navy when in 1910 and 1911 he demonstrated the feasibility of operating aircraft from ships.

APRIL

1—Fleet aviation was reorganized and assigned to two principal commands each exercising type functions within his Force, and one of whom, Commander Aircraft, Battle Force, served as type commander for all fleet aircraft. Carriers, with their aircraft, were assigned to Battle Force and all tender-based air and Fleet Air Bases at Pearl Harbor and Coco Solo were assigned to Base Force. The command Aircraft Scouting Force was abolished.

4—The rigid airship USS *Akron* (ZRS–4) crashed in a severe storm off Barnegat Light, N.J. Among the 73 fatalities were RADM. William A. Moffett, Chief, Bureau of Aeronautics, and CDR. Frank C. McCord, Commanding Officer of the *Akron*.

18—LT. G. A. Ott with LT. (jg) B. A. Van Voorhis as passenger, landed an O2U alongside the USS *Maryland* and was taken aboard with the ship underway in the first operational test of the "plane trap." It was a towed floating platform by means of which battleships could recover aircraft. Its success led to the adoption of the plane trap and to the development of a similar device for use by cruisers.

ing the best previous time for the crossing, exceeding the best distance of previous mass flights, and breaking a nine-day-old world record for distance in a straight line for Class C seaplanes with a new mark of 2,399.0 miles.

MARCH

27—An Act of Congress, approved by the President and popularly known as the Vinson-Trammell Act, established the composition of the Navy at the limit prescribed by the Washington and London Naval Treaties. The Act authorized construction of a number of ships, including one aircraft carrier of about 15,000 tons, and in other matters relating to aviation authorized the President to procure naval aircraft for ships and naval purposes in numbers commensurate with a treaty Navy. It also provided that not less than 10 percent of the authorized aircraft and engines be manufactured in Government plants. Under the authorization, the *Wasp* (CV–7) was laid down in 1936.

MAY

1—LT. Frank Akers made a hooded landing in an OJ–2 at College Park, Md., in the first demonstration of the blind landing system intended for carrier use and under development by the Washington Institute of Technology. In subsequent flights, LT. Akers took off from Anacostia under a hood and landed at College Park without assistance.

22—The NS–1, a single-engine biplane trainer, was ordered from Stearman Aircraft Company, Wichita, Kansas.

JUNE

4—The USS *Ranger* (CV–4) was placed in commission at Norfolk, CAPT. A. L. Bristol commanding.

21—First landings and takeoffs were made aboard the USS *Ranger* by the ship's aviators led by LCDR. A. C. Davis. After completing normal operations, the ship went full speed astern and aircraft were landed into the bow arresting gear.

30—A contract was issued to Douglas for the XTBD–1 torpedo bomber. This aircraft was the prototype for the TBD *Devastator* which remained in operational use through June 1942.

JULY

18—Eleven Naval Academy graduates, Class of 1932, reported at Pensacola for special training toward qualification as Naval Aviators. Their designation in January 1935 climaxed a series of events over the somewhat devious route of an honorable discharge upon graduation in 1932 because of lack of vacancies in the Navy, enrollment and training as Flying Cadets in the Army Air Corps, acceptance of the Navy offer of a commission in either the Navy or Marine Corps, and finally, completion of the special course at Pensacola.

AUGUST

1—LT. (jg) C. H. Kendall and LT. (jg) H. T. Orville, in a 206.4-mile flight from Birmingham, Ala., to Commerce, Ga., won the National Elimination Balloon Race and qualified for the international race.

NOVEMBER

1—The Naval Aircraft Factory was authorized to manufacture and test a flush-deck hydraulic catapult, Type H Mark I. This catapult was designed to launch landplanes from aircraft carriers and was the Navy's initial development of a hydraulic catapult, a type which was to prove capable of extensive refinement and which eventually was to be accepted as a primary means of launching landplanes from carriers.

15—Plans to install hydraulic flush deck catapults aboard carriers were formalized in a Bureau of Aeronautics request that space be reserved on CV–5 (*Yorktown*) and CV–6 (*Enterprise*) for two bow catapults on the flight deck and one athwartships on the hangar deck.

18—A contract was issued to the Northrop Corporation for the XBT–1, a two-seat scout and 1,000-pound dive bomber. This aircraft was the initial prototype in the sequence that led to the SBD *Dauntless* series of dive bombers introduced to the fleet in 1938 and used throughout World War II.

DECEMBER

14—Reinflation of the rigid airship *Los Angeles* was completed and she became airborne in the hangar at NAS Lakehurst after nearly three years of decommissioned status. Although not flown again, she continued in use as a test and experimental ship for another five years before being dismantled and scrapped.

15—The Secretary of the Navy approved acceptance of the XO3C–1, a single-engine biplane observation seaplane; subsequently converted to the XSOC–1. Aircraft of this type were operated from battleships and cruisers from late 1935 and during World War II.

21—Flight test of the NS–1, Stearman biplane trainer, was completed at Naval Air Station, Anacostia.

SEPTEMBER

26—The President approved a joint Army-Navy proposal for the transfer of air station properties, climaxing several years of study and discussion of the joint use of aviation facilities in certain areas. By this approval and a subsequent Executive Order, the Army agreed to turn over to the Navy: Rockwell Field on North Island, Luke Field on Ford Island, and Bolling Field at Anacostia, while the Navy agreed to turn over to the Army the Naval Air Station at Sunnyvale, Calif. In this exchange, it was understood that the Army would construct new fields at Bolling adjoining its previous location, and Hickam Field on Oahu, T. H.

OCTOBER

5—The first G Class airship, the G–1, was delivered to Naval Air Station, Lakehurst. This airship, formerly the *Defender* of Goodyear's commercial fleet, was used by the Navy for training purposes.

14–15—LCDR. K. McGinnis, LT. (jg) J. K. Averill, NAP T. P. Wilkinson, and crew of three flew an XP3Y–1 Consolidated patrol plane, powered with two 825-hp. Pratt & Whitney engines, from Cristobal Harbor, Canal Zone, to Alameda, Calif., in 34 hours 45 minutes and established new world records for Class C seaplanes of 3,281.383 miles airline distance and 3,443.255 miles broken-line distance.

NOVEMBER

15—The Chief, Bureau of Aeronautics, approved recommendations from a fighter design competition and thereby initiated development of the Grumman XF4F–1 biplane and the Brewster XF2A–1 monoplane. The developmental sequence thus set in motion, although it included many subsequent changes and modifications, provided prototypes of the Navy's first-line fighters in use when the United States joined World War II.

1936

JANUARY

20—The Bureau of Engineering, acting in response to a request from the Bureau of Aeronautics, initiated naval support to the Bureau of Standards for the development of radio meteorographs. These instruments, later renamed radiosondes, were to be attached to small free balloons and sent aloft to measure pressure, temperature, and humidity of the upper atmosphere, and to transmit this information to ground stations for use in weather forecasting and flight planning.

22—The USS *Ranger*, with 23 aircraft on board, arrived in Cook Inlet, Alaska, and began three weeks of operational tests to study the effects of cold weather on operating efficiency and to determine material and other improvements necessary for increasing carrier capabilities under extreme weather conditions.

MARCH

18—The flight test of the XN3N–1, prototype of the *Yellow Peril*, a primary trainer biplane, was completed at Naval Air Station, Pensacola.

APRIL

1—The Marine Corps Aviation Section, which had been set up independently under the Commandant in the previous year, was established as a Division. With the change, the Officer in Charge was given the title Director of Aviation and as such continued to serve in the dual capacity of advisor to the Commandant on aviation and head of the Marine Corps organization in the Bureau of Aeronautics, under an arrangement which had been in effect since the establishment of that bureau.

MAY

6—Construction of the facility, which was later named the David W. Taylor Model Basin, was authorized by legislation, providing buildings and appliances, for use by the Bureau of Construction and Repair in investigating and determining shapes and forms to be adopted for U. S. vessels, including aircraft.

JUNE

11—In an effort to adapt commercial airplane maintenance techniques to naval use, the Bureau of Aeronautics authorized Commander Aircraft, Base Force, to provide patrol squadrons with an extra aircraft for use as a rotating spare to replace squadron planes that were undergoing maintenance inspection.

JULY

10—The Chief, Bureau of Aeronautics, approved a program of improvements to the F4F and F2A fighters being developed by Grumman and Brewster. Most important, were the conversion of the Grumman design from a biplane to the monoplane XF4F–2 prototype for the F4F *Wildcat* of World War II, and the installation of larger engines in both, which promised a top speed of 300 m.p.h.

AUGUST

6—A contract was issued to Goodyear for two new non-rigid airships, the L–1 for training purposes, and the K–2 for coastal patrol.

9—The contractor's demonstration flights of the XOZ–1 rotary-winged aircraft, which included a water takeoff, were completed at the Naval Aircraft Factory. Pennsylvania Aircraft Corporation had modified this aircraft from an N2Y–1 trainer into an experimental gyroplane by installing a new engine and a rotary wing with cyclic control.

SEPTEMBER

9—The XPBS–1, a four-engined monoplane flying boat built by Sikorsky Aircraft, made its first flight. This aircraft, constructed as a long-range patrol plane, was later used as a transport.

30—The USS *Yorktown* (CV–5) was placed in commission at Norfolk, Va., with CAPT. E. D. McWhorter in command.

OCTOBER

1—Patrol aviation with its tenders was transferred from Base Force and assigned to the reestablished type command, Aircraft Scouting Force. With the change, five Patrol Wings, numbered 1 through 5, were commissioned as separate administrative commands over their assigned squadrons.

DECEMBER

17—The XPTBH–2, a twin-float seaplane designed by Hall Aluminum Aircraft Company, Inc., for patrol and torpedo attack, was accepted by the Navy. This was the last twin-float torpedo plane developed for the Navy.

23—A successful unmanned radio-controlled flight was made with a JH–1 drone, at the Coast Guard Air Station, Cape May, N.J. Take-off and landing were made using a landbased radio set; for flight maneuvers, control was shifted to an airborne TG–2.

1938

APRIL

21—The delivery of the XF2A–1 to the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics marked the initiation of full-scale wind tunnel tests to determine means of decreasing aerodynamic drag and thereby increasing high speed. The resulting tests indicated that the speed of the XF2A–1 could be increased 31 m.p.h. over the 277 m.p.h. already achieved, and led to the utilization of this technique in other high-performance aircraft, by both the Army and the Navy. The data thus obtained was also directly applicable to the design of new aircraft.

MAY

12—The USS *Enterprise* (CV–6) was commissioned at Newport News, Va., CAPT. N. H. White commanding.

17—The Naval Expansion Act, in its provisions for naval aviation, authorized an increase in total tonnage of underage naval vessels amounting to 40,000 tons for aircraft carriers, and also authorized the President to increase the number of naval aircraft to "not less than" 3,000. Carriers built as a result of this authorization were the *Hornet* (CV–8), and the *Essex* (CV–9), laid down in 1939 and 1941 respectively.

JUNE

1—The routine use of radiosondes (or radio meteorographs, as they were then called) to obtain data on weather conditions in the upper atmosphere was initiated at NAS Anacostia. By the close of the year, the *California* and *Lexington* were also outfitted with radiosondes.

8—After over two years of evaluation by Fleet Squadrons and various shore-based naval air activities, the antiblackout or abdominal belt, intended for use by pilots in dive bombing and other violent maneuvers, was returned to a developmental status with a finding by the Commander Aircraft, Battle Force, that the advantages of this belt were not sufficient to offset its disadvantages.

8—By policy established by the Secretary of the Navy, the provisions for maintenance of aircraft aboard carriers and aircraft tenders were limited to those required for upkeep and minor repairs.

JULY

1—New command billets titled Commander, Carrier Air Group, were authorized, and carrier squadrons were organized into groups each designated by the name of the carrier to which it was assigned.

AUGUST

23—A contract was issued to Martin for the XPB2M–1 four-engine flying boat. Initially intended as a patrol plane, this craft was later converted to the PB2M–1R *Mars* transport and served as a prototype for the JRM series of flying boats.

1—By Presidential Order, the Aeronautical Board, the Joint Board (later Joint Chiefs of Staff), the Joint Economy Board and the Munitions Board, all previously functioning by understanding between the Secretary of War and the Secretary of the Navy, began functioning under the direction and supervision of the President as Commander in Chief of the Army and Navy.

13—A Fleet Air Tactical Unit was authorized by the Chief of Naval Operations to provide research and advisory activities relating to operational use of new aircraft.

AUGUST

4—The *Yorktown* and *Enterprise* made successful launchings of SBC–3 and O3U–3 aircraft from flight deck and hangar deck catapults in the first practical demonstration of launching aircraft from carriers by means of a hydraulic flush-deck catapult and in the first demonstrations of catapulting aircraft from the hangar deck.

24—The Acting Secretary approved the detailing of a medical officer to the Bureau of Aeronautics for the purpose of establishing an Aviation Medical Research Unit.

SEPTEMBER

5—The President proclaimed the neutrality of the United States in the European War and directed that the Navy organize a Neutrality Patrol. In complying therewith, the Chief of Naval Operations ordered the Commander of the Atlantic Squadron to establish combined air and ship reconnaissance of the sea approaches to the United States and West Indies for the purpose of reporting and tracking any belligerent air, surface, or underwater units in the area.

8—The President proclaimed the existence of a limited national emergency and directed measures for strengthening national defenses within the limits of peacetime authorizations.

11—In the first redeployment of patrol squadrons on the Neutrality Patrol, VP–33, equipped with *Catalinas*, transferred from the Canal Zone to Guantanamo, Cuba, for operations over the Caribbean. Two days later, the *Catalinas* of VP–51 arrived at San Juan, P.R., from Norfolk to patrol the southern approaches to the Caribbean through the Lesser Antilles.

OCTOBER

1—To achieve an immediate expansion of pilot training, the syllabus was revised to set up a program of concentrated instruction which reduced the length of the training period from 12 to 6 months. The new program provided a primary course in landplanes and a basic phase in service landplanes and instrument flying for all students, and restricted each student in the advanced program to specialization in either patrol and utility aircraft, observation planes, or carrier aircraft. Ground school was similarly concentrated and shortened from 33 to 18 weeks.

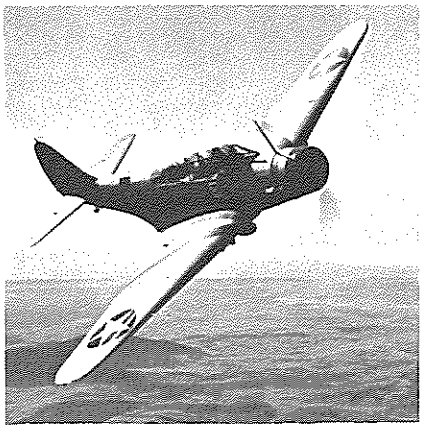
14—The Naval Aircraft Factory was authorized to develop radio control equipment for use in remote controlled flight-testing of aircraft so that dives, pullouts, and other maneuvers could be performed near the aircraft's designed strength without risking the life of a test pilot.

DECEMBER

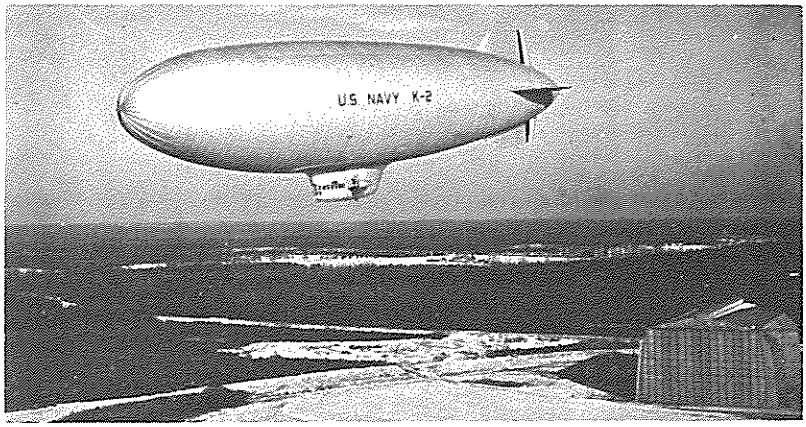
1—ENS. A. L. Terwilliger was designated a Master Horizontal Bomber; the first Naval Aviator in a fleet squadron to so qualify.

8—To effect a higher degree of coordination in research, the Secretary of the Navy directed that the Bureaus of Aeronautics and Ordnance acting separately, and the Bureaus of Engineering and Construction and Repair acting as one unit, designate an officer to head a section in the respective Bureaus devoted to science and technology and also to act as a liaison officer with the Naval Research Laboratory and as a member of the Navy Department Council for Research. By the same order, the duties performed in the Office of the Chief of Naval Operations concerned with research and invention were transferred to the Office of the Secretary and placed under the administration of the Director, Naval Research Laboratory.

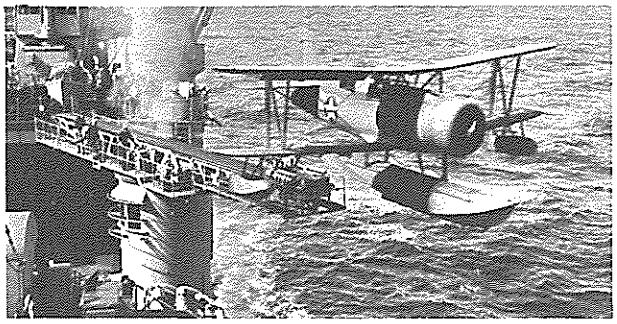
20—A contract was issued to Consolidated for 200 PBY type aircraft to support an increase in patrol plane squadrons growing out of Neutrality Patrol requirements. This was the largest single order for naval aircraft since the end of World War I.



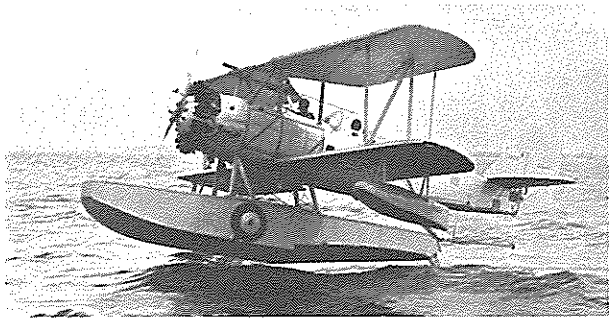
A TBD–1 DEVASTATOR TORPEDO PLANE



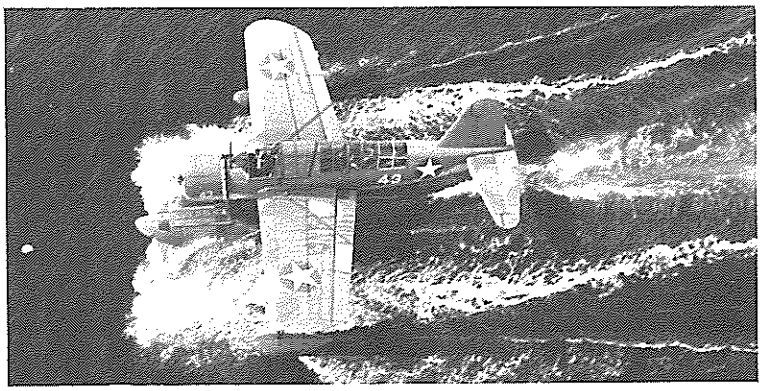
THE NON-RIGID AIRSHIP K–2, PROTOTYPE FOR THE WORLD WAR II LTA FLEET



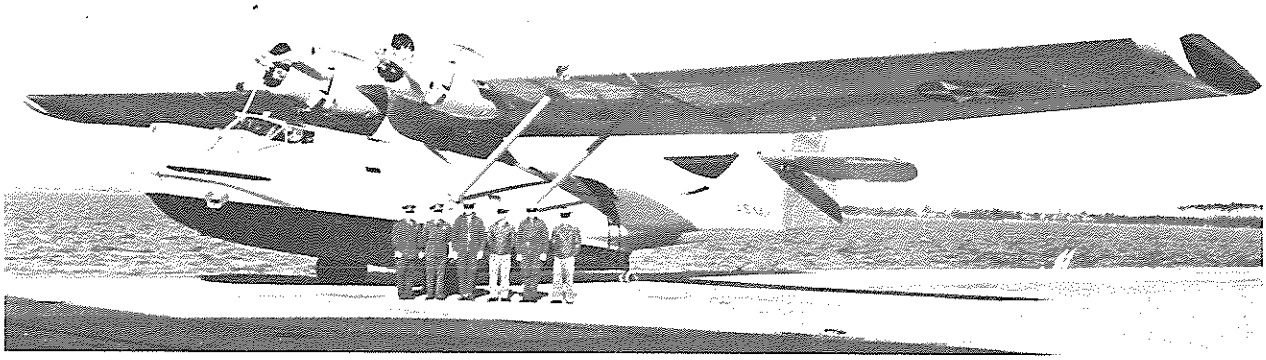
A CURTISS SOC–1 IS CATAPULTED FROM A HEAVY CRUISER



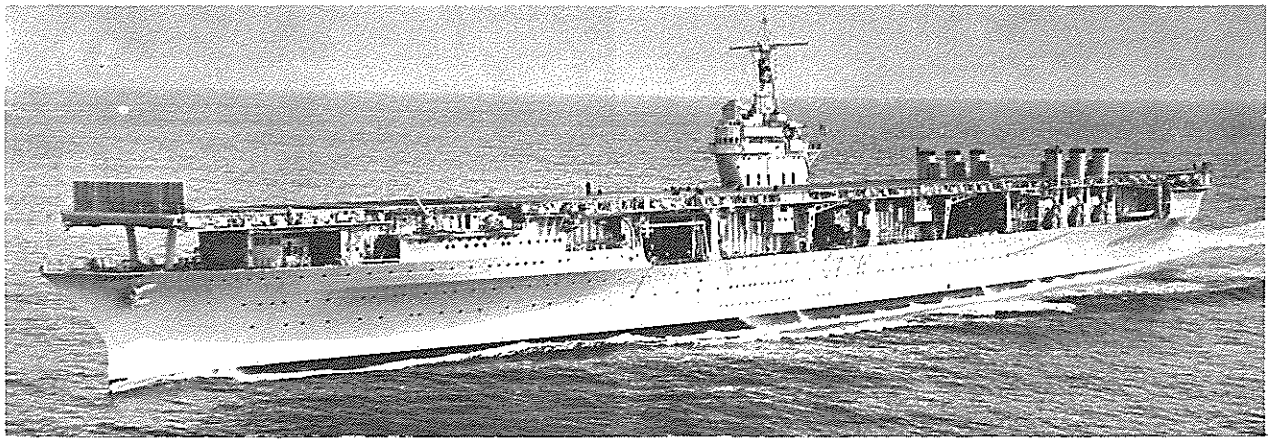
AMPHIBIOUS VERSION OF VOUGHT SCOUT-OBSERVATION O3U–1



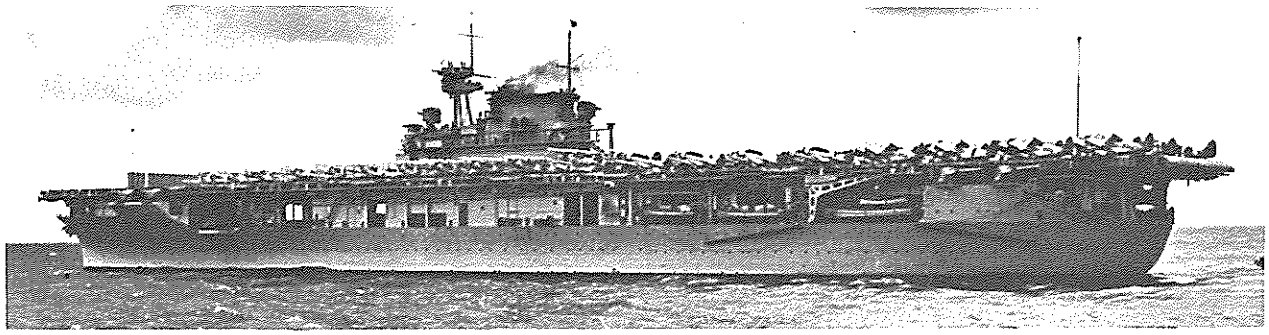
OS2U KINGFISHER USED ON SHIPBOARD AND LATER FOR INSHORE PATROL



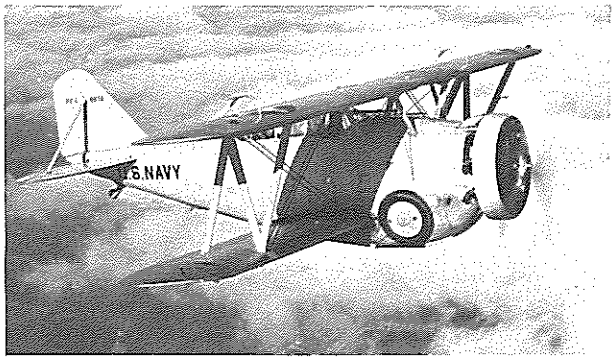
XP3Y–1 COMMANDED BY K. McGINNIS SET 3443 MILE RECORD ON NON-STOP FLIGHT FROM PANAMA TO ALAMEDA, OCTOBER 1935



THE 14,500 TON USS RANGER, CV–4 WAS THE FIRST AMERICAN SHIP DESIGNED AS AN AIRCRAFT CARRIER FROM THE KEEL UP



THE USS ENTERPRISE, CV–6, PREPARING TO GET UNDERWAY WITH ALL PLANES OF HER AIR GROUP ON THE FLIGHT DECK

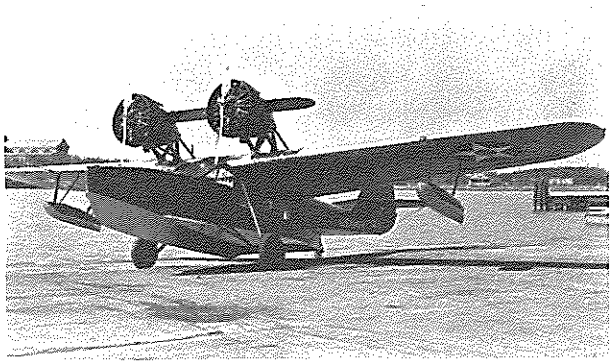


FF–1, THE FIRST FIGHTER TO USE RETRACTABLE LANDING GEAR

PAGE AND GUYMON MADE LONG DISTANCE BLIND FLIGHT 1930

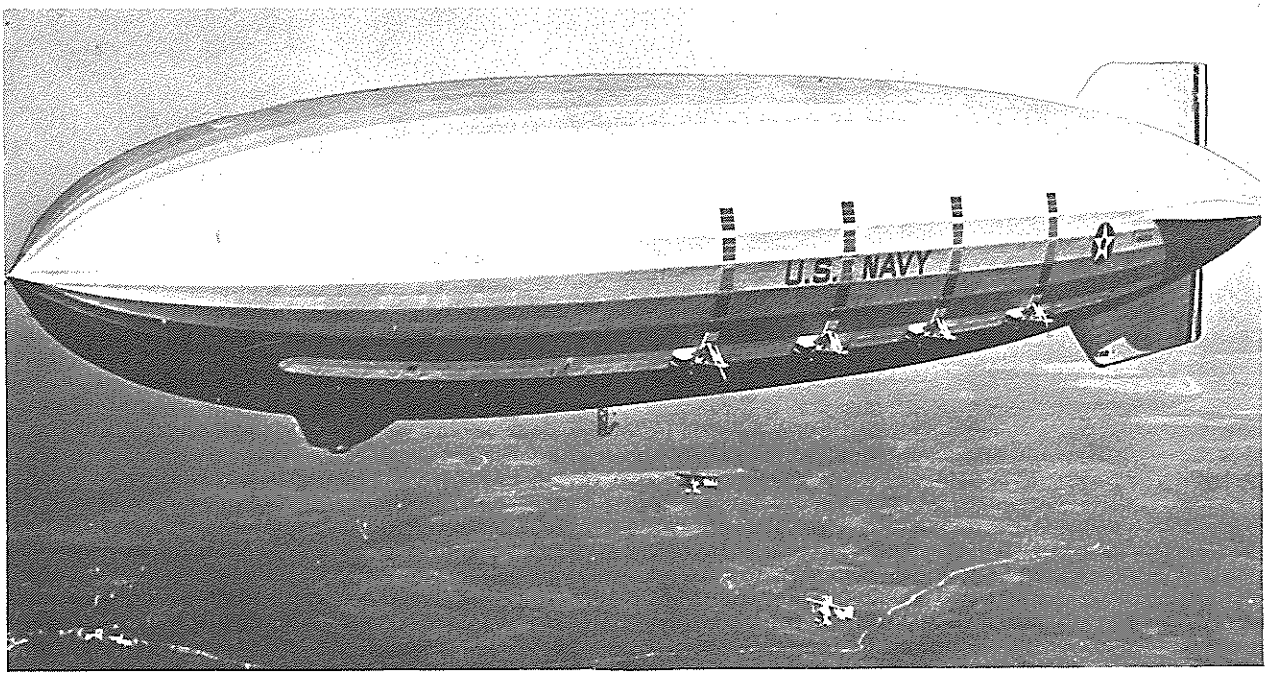
CAMERA MAN IN SU–1 SHOOTS OBLIQUE AERIAL PHOTOGRAPH

XOP–1, THE NAVY'S FIRST AUTOGIRO ARRIVES AT ANACOSTIA

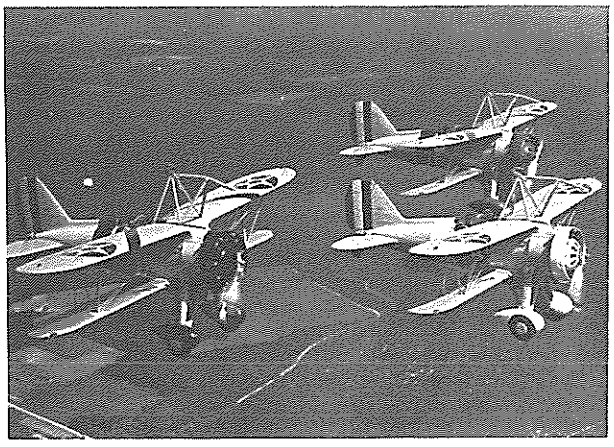


THE FIRST PRESIDENTIAL AIRCRAFT WAS THE DOUGLAS RD–2

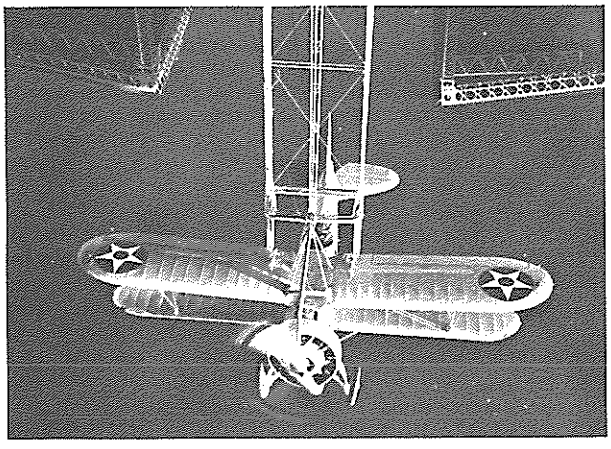
THE XN3N–2, YELLOW PERIL, A TRAINING PLANE BUILT AT NAF



USS MACON ZRS–5, PREPARES TO TAKE PROTECTIVE FIGHTERS ON BOARD. THERE WAS SPACE FOR FIVE PLANES IN THE HANGAR



CURTISS F9C–2'S EQUIPPED WITH AIRSHIP HOOK-ON GEAR



F9C–1 BEING HOISTED INTO THE HANGAR OF THE USS AKRON

PART V
WORLD WAR II
1940–45

Thirty years after the Navy had acquired its first airplane, and only 19 years after it had acquired its first aircraft carrier, naval aviation faced the supreme test of war. When it was called upon to carry the fight to the enemy, it not only carried out its tasks but forged ahead to become the very backbone of fleet striking power.

If it had not already been shown in combat before the United States entered the war, all doubts as to the potency of naval air power were removed by the infamous, yet skillfully executed attack on Pearl Harbor, when Japanese carrier aircraft in one swift stroke devastated our principal naval base in the Pacific and eliminated a major portion of the Navy's heavy surface power. That our own forces had the kernel of a similiar potential was demonstrated on a much smaller scale as carrier forces struck the first retaliatory blows.

The geographic position of the United States put it squarely between two wars that had little in common. Air operations on the Atlantic side, except for participation in three amphibious operations, were essentially a blockade and a campaign to protect ships delivering raw materials to our factories and war munitions and reinforcements to our Allies. In the Pacific, it was a matter of stopping an enemy advance which, in a few short months, had spread over all the western and parts of the south and central Pacific, and then carrying out the bitterly contested task of driving him homeward across the broad expanse of an island-dotted sea.

The country was hardly ready for either campaign. The Navy and Marine Corps air arms could muster only 7 large and 1 small aircraft carriers, 5 patrol wings and 2 Marine aircraft wings, 5,900 pilots and 21,678 enlisted men, 5,233 aircraft of all types including trainers, and a few advanced air bases. But aided by its distance from the enemy and fortunate in its industrial power, the United States built the ships, planes and equipment, and trained the land, sea and air forces that ultimately beat down the enemy, drove him from strategically located bases, cut off his raw materials, and placed the allied forces in position to launch final air and amphibious offensives against his homeland—offensives that were made unnecessary as the awesome destructive power of the atom was released over Hiroshima and Nagasaki.

For the first time in history, naval engagements were fought entirely in the air without opposing surface forces sighting each other. New words and phrases entered the aviator's lexicon; words like air support, hunter-killer, JATO, CIC, CAP, bogie, scramble and splash. Radar lighted the night and gave new eyes to the fleet; advances in technology, particularly in electronics, improved the defense and added power to the offense. The scientist contributed directly to the war effort in both the development of specialized equipment and in the application of scientific principles to operational tactics. Logistics took on new importance. Refueling and replenishment at sea were developed to a high art and increased the mobility and staying power of fleet forces.

In the course of the war, Navy and Marine aircraft alone destroyed over 15,000 enemy aircraft in the air and on the ground, and without any assistance from other agents sank 161 Japanese warships totalling over 725,000 tons, 447 Japanese merchant ships of better than 1,500,000 tons, and in the Atlantic destroyed 63 German submarines. It was a creditable record, but the Navy's air arm did not play an entirely independent role. It operated as it had developed, as an integral part of naval forces, contributing its full share to the power of the fleet and to the achievement of its mission in controlling the sea.

Many have said that World War II witnessed the full development of aviation, but generalities are often misleading. Many of the opinions expressed before the war on the effect of air power on naval operations were shown up as misconceived, if not false, theories. The bombing tests of the 1920's proved to some that navies were obsolete and that no ship could again operate within the range of land-based air, but carrier task force operations in the war gave a lie to such conclusions. Advocates of independent air power questioned both the possibility and the usefulness of close air support for troops, but such support was proved not only possible but indispensable. Those who questioned the importance of the airplane to navies were equally off the mark. The disappointment of naval officers who visualized fleet engagements in the tradition of Trafalgar and Jutland was no doubt as great as that of the air power theorists who had seen their predictions go awry. By test of war it had become exceedingly clear that neither an Army nor a Navy could either survive or achieve an objective in war without first achieving superiority in the air. It had also become clear that neither could exert as much force by itself as it could with the aid of air striking power. Aviation had indeed come of age.

beginning 1 July, and a regular increase to an entry rate of 300 per month within a year.

27—The President established a National Defense Research Committee to correlate and support scientific research on the mechanisms and devices of war. Among its member were officers of the War and Navy Departments appointed by the respective Secretaries. Although research on the problems of flight was specifically excluded from its functions, this organization made substantial contributions in various fields of importance to naval aviation, including airborne radar.

JULY

19—Authorization for a further expansion of the Navy provided an increase of 200,000 tons in the aircraft carrier limits set the previous month, and a new aircraft ceiling of 15,000 useful planes. The act also allowed further increases in aircraft strength on Presidential approval.

SEPTEMBER

2—In exchange for 50 four-stack destroyers, Great Britain, by formal agreement ceded to the United States for a period of 99 years, sites for naval and air bases in the Bahamas, Jamaica, St. Lucia, Trinidad, Antigua, and British Guiana, and extended similar rights freely and without consideration for bases in Bermuda and Newfoundland. Acquisition of these sites advanced our sea frontiers several hundred miles and provided bases from which naval ships and aircraft could cover strategically important sea approaches to our coast.

OCTOBER

5—The Secretary of the Navy placed all divisions and aviation squadrons of the Organized Reserve on short notice for call to active duty and granted authority to call Fleet Reservists as necessary. On the 24th the Bureau of Navigation announced plans for mobilizing the aviation squadrons, which called for one-third to be ordered to active duty by 7 November and all by 1 January 1941.

9—The Secretary approved a recommendation by the General Board, that 24 of the authorized submarines be equipped to carry aviation gasoline for delivery to seaplanes on the water. This was in addition to the *Nautilus* which had demonstrated her ability to refuel patrol planes and had conducted a successful test dive to 300 feet with aviation gasoline aboard; and to the *Narwhal* and *Argonaut* which were being altered to carry 19,000 gallons of aviation gasoline each.

23—Within the Atlantic Squadron, an administrative command was set up for carrier aviation entitled, "Aircraft, Atlantic Squadron."

24—An administrative command for patrol aviation in the Atlantic Squadron was set up under the title, "Patrol Wings, Atlantic Squadron."

28—The Chief of Naval Operations reported that aircraft with some form of armor and fuel protection were just beginning to go into service use, and that within a year all fleet aircraft, except those assigned Patrol Wing 2, would have such protection.

NOVEMBER

1—A reorganization of the Fleet changed the administrative organization of aviation by dividing the forces between two oceans which was the beginning of the independent development of forces according to strategic requirements. In the Atlantic, aviation was transferred from Scouting Force to Patrol Force, which was formed in place of the Atlantic Squadron as a fleet command parallel to Scouting Force, and set up under Commander Aircraft Patrol Force and Commander Patrol Wings Patrol Force. In the Pacific, Patrol Wings remained attached to Scouting Force under the combined command Commander Patrol Wings U.S. Fleet and Commander Aircraft Scouting Force.

15—The seaplane tender USS *Curtiss* (AV–4) first of two ships of her class, was commissioned at Philadelphia, CDR. S. P. Ginder commanding.

15—Naval air operations began from Bermuda. First to operate were the planes of Patrol Squadron 54 based on the USS *George E. Badger* (AVD–3).

1941

FEBRUARY

1—The Atlantic and Pacific Fleets were established, completing the division begun in the previous November and changing the titles of aviation commands in the Atlantic Fleet to "Aircraft, Atlantic Fleet" and "Patrol Wings, Atlantic Fleet". No change was made in the Pacific Fleet aviation organization at this time.

10—As an initial step in training patrol plane pilots to make blind landings, utilizing radio instrument landing equipment which was being procured for all patrol aircraft and their bases, a one-month course of instruction began under Project Baker. This

and all acts or threats of aggression directed toward any part of the Western Hemisphere.

JUNE

2—The USS *Long Island*, first escort carrier of the U.S. Navy, was commissioned at Newport News, Va., CDR. D. B. Duncan commanding. Originally designated AVG–1, the *Long Island* was a flush-deck carrier converted in 67 working days from the cargo ship *Mormacmail*.

4—The Naval Aircraft Factory reported that development of airborne television had progressed to the point that signals transmitted by this means could be used to alter the course of the transmitting plane to pass over a target.

11—An Aircraft Armament Unit was formed at the Naval Air Station, Norfolk with LCDR. W. V. Davis as Officer in Charge, to test and evaluate armament installations of increasing complexity.

30—Turboprop engine development was initiated as a joint Army-Navy project, with a Navy contract to Northrop Aircraft for the design of an aircraft gas turbine developing 2,500 hp. at a weight of less than 3,215 pounds.

JULY

1—The first landing, takeoff, and catapult launching from an escort carrier were made aboard the USS *Long Island*, by LCDR. W. D. Anderson, Commanding Officer of VS–201.

1—The Test, Acceptance and Indoctrination Units that had been established at San Diego and Norfolk in May to fit out new patrol aircraft and to indoctrinate new crews in their use, were expanded and set up as separate commands. The San Diego Unit, which retained its original name, was placed under Commander Aircraft Scouting Force, and the Norfolk unit became Operational Training Squadron under Commander Patrol Wings, Atlantic.

1—Patrol Wing, Support Force, was redesignated and commissioned as Patrol Wing 7, CAPT. H. M. Mullinix commanding.

3—The seaplane tender USS *Barnegat* (AVP–10), first of 26 ships of her class, was commissioned at Bremerton, CDR. F. L. Baker commanding.

4—Planes of Patrol Squadron 72, based on the USS *Goldsborough* (AVD–5), flew protective patrols from Reykjavik, Iceland, until the 17th, to cover the arrival of Marine Corps garrison units from the United States.

8—Patrol Wing 8 was commissioned at Norfolk, CDR. J. D. Price commanding.

12—The Naval Research Laboratory was transferred from the Office of the Secretary to the cognizance of the Bureau of Ships, and a Naval Research and Development Board was established in the Office of the Secretary, composed of representatives of the Chief of Naval Operations and the Bureaus of Aeronautics, Ordnance, Ships, and Yards and Docks, and led by a civilian scientist with the title Coordinator of Research and Development.

18—Aviation was given representation on the highest of the Army and Navy boards as membership of the Joint Board was revised to include the Deputy Chief of Staff for Air and the Chief of the Bureau of Aeronautics.

21—The requirement that all students assigned to the carrier-plane phase of flight training be given time in each of the three basic aircraft types was abolished, and the practice of assigning students to specialized training in either fighters, scout bombers or torpedo planes began.

28—To establish a continuing organization for training flight crews, the Chief of Naval Operations directed that action be taken as expeditiously as practicable to provide additional gunnery and tactical training in the pilot training program; to establish within the Atlantic and Pacific Fleets at Norfolk and San Diego, Advanced Carrier Training groups to indoctrinate newly designated Naval Aviators in the operation of current model carrier aircraft; and to assign to a number of patrol squadrons in each fleet, the primary task of providing familiarization, indoctrination, advanced gunnery and tactical training for new flight crews.

28—The Operational Training Squadron of the Atlantic Fleet, and the Test, Acceptance and Indoctrination Unit of the Pacific Fleet were redesignated Transition Training Squadron, Atlantic and Pacific respectively.

AUGUST

1—The Bureau of Aeronautics requested the Naval Research Laboratory to develop radar guidance equipment for assault drones, both to relay target information to a control operator and to serve as automatic homing equipment. This marked the initiation of radar applications to guided missiles.

6—Patrol Squadrons 73 and 74 initiated routine air patrols from Reykjavik, Iceland, over North Atlantic convoy routes.

George H. Mills commanding, and Airship Squadron 12, LCDR. Raymond F. Tyler commanding, were commissioned at NAS Lakehurst.

5—A change in regulations, covering display of National Insignia on aircraft, returned the star to the upper right and lower left wing surfaces and revised rudder striping to 13 red and white horizontal stripes.

7—Expansion of naval aviation to 27,500 useful planes was approved by the President.

11—The USS *Saratoga* (CV–3), while operating at sea 500 miles southwest of Oahu, was hit by a submarine torpedo and forced to retire for repairs.

11—Patrol Squadron 22, with PBY–5 *Catalinas*, joined Patrol Wing 10 at Ambon, the first aviation reinforcements from the Central Pacific to reach Southwest Pacific Forces opposing the Japanese advance through the Netherlands East Indies.

14—The formation of four Carrier Aircraft Service Units (CASU) from four small Service Units, perviously established in the Hawaiian area, was approved.

16—To protect the advance of Task Force 8 for its strike against the Marshall and Gilbert Islands, planes of Patrol Squadron 23 began daily search of the waters between their temporary base at Canton Island and Suva in the Fijis. These were the first combat patrols by aircraft in the South Pacific.

23—The first naval aircraft to operate in the Samoan Islands, OS2U's of VS–1–D14, arrived with Marine Corps reinforcements from San Diego.

30—The Secretary authorized a glider program for the Marine Corps consisting of small and large types in sufficient numbers for the training and transportation of two battalions of 900 men each.

FEBRUARY

1—The Secretary of the Navy announced that all prospective naval aviators would begin their training with a three months' course emphasizing physical conditioning and conducted by Pre-Flight Schools to be established at universities in different parts of the country. The training began at the Universities of North Carolina and Iowa in May, the University of Georgia and St. Mary's College, Calif., in June, and at Del Monte, Calif., in January 1943.

1—First U.S. Carrier Offensive—Task Forces 8 (VADM. W. F. Halsey) and 17 (RADM. F. J. Fletcher), built around the carriers *Enterprise* and *Yorktown*, bombed and bombarded enemy installations on the islands of Wotje, Kwajalein, Jaluit, Makin, and Mili in the Marshall and Gilbert Islands.

12—The Chief of Naval Operations promulgated an advanced base program using the code names "Lion" and "Cub" to designate major and minor bases, and in July added "Oaks" and "Acorns" for aviation bases. This was the beginning of a concept of functional components which developed as the war progressed and which provided planners and commanders with a means of ordering standardized units of personnel, equipment, and material to meet any special need in any area, in much the same manner as ordering from a mail-order catalogue.

16—A Navy developed Air-Track blind landing system was in daily use in Iceland for landing flying boats. Other blind-landing systems were in various phases of development, and work on the Ground Controlled Approach system had progressed to the point that Navy personnel had made talk-down landings at the East Boston (Commonwealth) Airport.

21—The seaplane tender *Curtiss* and Patrol Squadron 14 arrived at Noumea, New Caledonia, to begin operations from what became a principal Navy base in the South Pacific during the first year of the war.

23—The Bureau of Aeronautics outlined a comprehensive program which became the basis for the wartime expansion of pilot training. In place of the existing 7 months' course, the new program required 11½ months for pilots of single or twin-engine aircraft and 12½ months for four-engine pilots, and was divided into three months at Induction Centers, 3 months in Primary, 3½ months in Intermediate and 2 or 3 months in Operational Training, depending on type aircraft used.

24—First Wake Island Raid—A striking force, (VADM. W. F. Halsey) composed of the carrier *Enterprise* with cruiser and destroyer screen, attacked Wake Island.

27—The seaplane tender USS *Langley*, formerly the first carrier of the U.S. Navy, was sunk by enemy air attack 74 miles from her destination while ferrying 32 AAF P–40's to Tjilatjap, Java.

MARCH

1—ENS. William Tepuni, USNR, piloting a Lockheed *Hudson*, PBO, of VP–82 based at Argentia, attacked and sank the *U–656* southwest of Newfoundland; the first German submarine sunk by U.S. forces in World War II.

A. W. Fitch) with the carrier *Lexington* south of the Louisiades (5 May); and after stationing an attack group in the probable track of the enemy transports, moved northward in search of the enemy covering force. Carrier aircraft located and sank the light carrier *Shoho* covering a convoy (7 May), while Japanese aircraft hit the separately operating attack group and sank one destroyer and one fleet tanker. The next day, the Japanese covering force was located and taken under air attack, which damaged the carrier *Shokaku*. Almost simultaneously enemy carrier aircraft attacked Task Force 17, scoring hits which damaged the *Yorktown* and set off uncontrollable fires on the *Lexington*, as a result of which she was abandoned and was sunk (8 May). Although the score favored the Japanese, they retired from action and their occupation of Port Moresby by sea was deferred and finally abandoned.

10—The possibility of increasing the range of small aircraft, by operating them as towed gliders, was demonstrated at the Naval Aircraft Factory when LCDRs. W. H. McClure and R. W. Denbo hooked their F4F's to tow lines streamed behind a twin-engined BD (Army A–20), cut their engines and were towed for an hour at 180 knots at 7,000 feet.

10—The USS *Ranger* (CV–4), on a transatlantic ferry trip, reached a position off the African Gold Coast and launched 60 P–40 *Warhawks* of the Army Air Force to Accra, from which point they were flown in a series of hops to Karachi, India, for operations with the 10th AAF. This was the first of four ferry trips made by the *Ranger* to deliver AAF fighters across the Atlantic, the subsequent launches being accomplished on 19 July 1942, 19 January 1943, and 24 February 1943.

10—Inshore Patrol Squadron VS–4-D14 arrived in the Tonga Islands with the base construction and garrison convoy and set up facilities to conduct anti-submarine patrols from Nukualofa Harbor on Tongatabu.

11—The President ordered that an Air Medal be established for award to any person who, while serving in any capacity in or with the Army, Navy, Marine Corps, or Coast Guard after 8 September 1939, distinguishes or has distinguished himself by meritorious achievement while participating in aerial flight.

15—The design of the National Star Insigne was revised by eliminating the red disc in the center of the star, and use of horizontal red and white rudder striping was discontinued.

15—The Chief of Naval Operations ordered that an Assistant Chief of Naval Operations (Air) be established to deal with aviation matters directly under the Vice Chief of Naval Operations and that the Chief of the Bureau of Aeronautics fill the new office as additional duty. In complying with a further provision of the order that such readjustment of functions be made as would serve the interest of the order, the Vice Chief of Naval Operations subsequently concentrated the aviation functions already being performed in his office into a new Division of Aviation.

15—A VR–2 flight from Alameda to Honolulu, the first transoceanic flight by NATS aircraft, initiated air transport service in the Pacific.

20—RADM. J. S. McCain reported for duty as Commander Aircraft, South Pacific, a new command established to direct the operations of tender and shore-based aviation in the South Pacific area.

26—The feasibility of jet-assisted takeoff was demonstrated in a successful flight test of a Brewster F2A–3, piloted by CDR. C. Fink Fischer, at Naval Air Station, Anacostia, using five British anti-aircraft solid propellant rocket motors. The reduction in takeoff distance was 49 percent.

27—The transfer of Patrol Wing 4 from Seattle to the North Pacific began with the arrival of the Commander at Kodiak, Alaska.

JUNE

3–4—In an attempt to divert forces from the Midway area, a Japanese carrier force launched small raids on Dutch Harbor, hitting twice on the third and once on the fourth and doing considerable damage to installations ashore. PBY's located the carriers on the fourth but attacks by 11th AAF bombers were unsuccessful.

3–6—THE BATTLE OF MIDWAY—A strong Japanese thrust in the Central Pacific to occupy Midway Island, was led by a four-carrier Mobile Force, supported by heavy units of the Main Body (First Fleet) and covered by a diversionary carrier raid on Dutch Harbor in the Aleutians. This attack was met by a greatly outnumbered United States carrier force composed of Task Force 17 (RADM. F. J. Fletcher) with the *Yorktown*, and Task Force 16 RADM. R. A. Spruance) with *Hornet* and *Enterprise*, and by Navy, Marine Corps, and Army air units based on Midway.

Planes from Midway located and attacked ships of the Japanese Occupation Force 600 miles to the west (3 June), and of the Mobile Force (4 June) as it sent

manent assignment of squadrons was abolished in favor of assignment as the situation required.

19—The seaplane tender *Casco* established an advanced base in Nazan Bay, Atka, to support seaplane operations against Kiska, which included antishipping search, bombing of enemy positions, and cover for surface force bombardments.

24—The Navy entered the helicopter field with a decision to procure four Sikorsky helicopters for study and development by Navy and Coast Guard aviation forces.

AUGUST

1—A J4F *Widgeon* of Coast Guard Squadron 212, based at Houma, La., scored the first Coast Guard kill of an enemy submarine with the sinking of the *U–166* off the passes of the Mississippi.

7 August 1942–9 February 1943—CAPTURE OF GUADALCANAL—Air support for the U.S. Marines' first amphibious landing of World War II was provided by three carriers of Air Support Force (RADM. L. Noyes), and by Navy, Marine, and Army units of Aircraft, South Pacific (RADM. J. S. McCain) operating from bases on New Caledonia and in the New Hebrides. Carrier forces withdrew from direct support (9 Aug.) but remained in the area to give overall support to the campaign during which they participated in several of the naval engagements fought over the island. *Saratoga* and *Enterprise* sank the Japanese light carrier *Ryujo* in the BATTLE OF THE EASTERN SOLOMONS (23–25 Aug.); *Saratoga* was damaged by a submarine torpedo (31 Aug.) and forced to retire; and *Wasp* was sunk by a submarine (15 Sep.) while escorting a troop convoy to Guadalcanal. *Hornet*, in Task Group 17 (RADM. G. D. Murray), hit targets in the Buin-Tonolei-Faisi area (5 Oct.); attacked beached Japanese transports and supply dumps on Guadalcanal; destroyed a concentration of seaplanes at Rekata Bay (16 Oct.); and, with *Enterprise*, fought in the BATTLE OF SANTA CRUZ (26–27 Oct.) in which she was sunk by air attack. In final carrier actions of the campaign, *Enterprise* took part in the last stages of the NAVAL BATTLE FOR GUADALCANAL (12–15 Nov.), assisting in sinking 89,000 tons of war and cargo ships, and in the BATTLE OF RENNELL ISLAND (29–30 Jan.) in which two escort carriers also participated.

Ashore, air forces in great variety provided direct support. Navy patrol squadrons flew search, rescue, and offensive missions from sheltered coves and harbors. Marine Fighter Squadron 223 and Scout Bombing Squadron 232, delivered by the escort carrier *Long Island*, initiated operations from Henderson Field on Guadalcanal (20 Aug.) and were joined within a week by AAF fighter elements and dive bombers from *Enterprise*, and by other elements as the campaign progressed. Until the island was secure (9 Feb.), these forces flew interceptor patrols, offensive missions against shipping, and close air support for the Marines and for Army troops relieving them (13 Oct.). Marine air units, carrying the major air support burden, accounted for 427 enemy aircraft during the campaign.

10—The headquarters of Patrol Wing 3 shifted within the Canal Zone from NAS Coco Solo to Albrook Field for closer coordination with the Army Air Force Command in the defense of the Panama Canal.

12—The USS *Wolverine* (IX–64) was commissioned at Buffalo, CDR. G. R. Fairlamb commanding. This ship and the USS *Sable*, commissioned the following May, were Great Lakes excursion ships converted for aviation training and as such they operated for the remainder of the war on the inland waters of Lake Michigan. They provided flight decks upon which hundreds of student naval aviators qualified for carrier landings and many flight deck crews received their first practical experience in handling aircraft aboard ship.

13—The Commander in Chief U.S. Fleet directed that an Aircraft Experimental and Developmental Squadron be established about 30 September 1942 at Naval Air Station, Anacostia. This squadron, which replaced the Fleet Air Tactical Unit, was to to conduct experiments with new aircraft and equipment in order to determine their practical application and tactical employment.

15—Patrol Wing 11 was commissioned at Norfolk, CDR. S. J. Michael commanding. Five days later the Wing moved to San Juan, P.R., for operations under the Caribbean Sea Frontier.

20—The designation of escort carriers was changed from AVG to ACV.

24—The USS *Santee* (ACV–29), CAPT. W. D. Sample commanding, was placed in commission at the Norfolk Navy Yard; the first of four escort carriers of the Sangamon Class converted from Cimarron Class fleet oilers.

30—The occupation of Adak by Army forces and the establishment of an advanced seaplane base there by the tender *Teal*, put North Pacific forces within 250 miles of occupied Kiska and in a position to maintain a close watch over enemy shipping lanes

from French Morocco over the western Mediterranean, the Strait of Gibralter, and its approaches.

23—The VS–173, a full-scale model of a fighter aircraft with an almost circular wing, made its first flight at the Vought-Sikorsky plant, Stratford, Conn. A military version of this aircraft, the XF5U–1, was constructed later but was never flown.

DECEMBER

1—Fleet Air Wing 15, CAPT. G. A. Seitz commanding, was commissioned at Norfolk for operations under the Moroccan Sea Frontier.

1—Fleet Airship Wing 30, CAPT. George H. Mills commanding, was commissioned at NAS Lakehurst to administer Atlantic Fleet Airship Groups and their component squadrons.

1—Airship Patrol Group 3 at NAS Moffett Field was redesignated Fleet Airship Wing 31.

26—The Chief of Naval Operations approved the merger of the Service Force Aviation Repair Unit and Advanced Cruiser Aircraft Training Unit, established in October 1941 and June 1942 respectively, to form a Scout Observation Service Unit (SOSU) with a mission to maintain battleship and cruiser aircraft and to indoctrinate pilots in their specialized operations. This SOSU, the first of three established during World War II was commissioned 1 January 1943.

31—The USS *Essex* (CV–9), CAPT. D. B. Duncan commanding, was placed in commission at Norfolk; the first of 17 ships of her class commissioned during World War II.

1943

JANUARY

1—Air Force, Atlantic Fleet, was established, RADM. A. D. Bernhard commanding, to provide administrative, material, and logistic services for Atlantic Fleet aviation in place of the former separate commands Fleet Air Wings, Atlantic, and Carriers, Atlantic, which were abolished. By the same order Fleet Air, Quonset, was established as a subordinate command.

7—A change in the pilot training program was implemented by the opening of Flight Preparatory Schools in 20 colleges and universities in all parts of the country. Under the new program, students began their training at these schools with three months of academic work fundamental to ground school subjects they then proceeded to War Training Service courses conducted by the Civil Aeronautics Administration at universities for two months' training in ground subjects and elementary flight under civilian instructors; then to the Pre-Flight Schools for three months of physical conditioning; and finally to Navy flight training beginning at one of the Primary Training Bases.

7—Development of the first naval aircraft to be equipped with a turbojet engine was initiated with the issuance of a Letter of Intent to McDonnell Aircraft Corporation for engineering, development, tooling, and two VF airplanes. Two Westinghouse 19–B turbojet engines were later specified and the aircraft was designated XFD–1. It became the prototype for the FH–1 *Phantom* jet fighter.

10—Fleet Air Wing 15 headquarters was transferred from Norfolk to Port Lyautey, French Morocco, to direct patrol plane operations in the Mediterranean and Gibraltar Strait area.

14—The USS *Independence* (CV–22), CAPT. G. R. Fairlamb, Jr., commanding, was placed in commission at Philadelphia; the first of nine light carriers of her class constructed on Cleveland Class cruiser hulls.

17—Following tests conducted at NAS San Diego by six experienced pilots flying F4U–1's, the Commanding Officer of VF–12, CDR. J. C. Clifton, reported that anti-blackout suits raised their tolerance to accelerations encountered in gunnery runs and other maneuvers by three to four g's.

FEBRUARY

1—Regulations governing display of National Insignia on aircraft were again revised by the order to remove those on the upper right and lower left wing surfaces.

11—A contract was issued to the Ryan Aeronautical Corporation for the XFR–1 fighter. This aircraft incorporated a conventional reciprocating engine for use in normal operations and the turbojet for use as a booster during takeoffs and maximum performance flights. Development and production were handled on a crash basis to equip escort carrier squadrons at the earliest possible data. However, numerous bugs were encountered which prevented the FR–1's assignment to combat squadrons prior to the cessation of World War II.

13—The Naval Air Transport Service was reorganized and the establishment of Wings was directed for the Atlantic and west coast squadrons.

13—The Vought F4U *Corsair* was taken into action for the first time when pilots of Marine Fighter